(Second Series) Vol. 3.—No. 2.

Western Australia.

JOURNAL

OF THE

DEPARTMENT OF AGRICULTURE

OF

WESTERN AUSTRALIA

By Direction of

The HON. THE MINISTER FOR AGRICULTURE

PUBLISHED QUARTERLY.

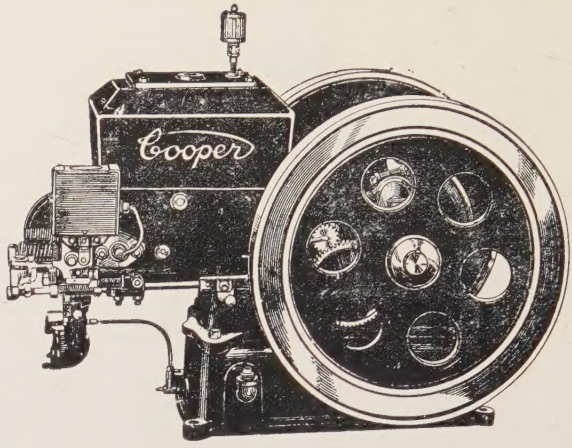
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CONTENTS.

		Page
FRUIT-FLY AND ITS EFFECTIVE CONTROL		139
BULLS AND BUTTER	P. G. Hampshire	143
STRAWBERRY CLOVER	Carne, Gardner and Adams	155
WOOLLY CLOVER	C. A. Gardner and A. B. Adams	158
COMMON AILMENTS OF STOCK AND THEIR TREATMENT	F. Murray-Jones	160
CRINKLE OF JAPANESE PLUMS	W. M. Carne	175
APPLE OF SODOM	W. M. Carne and C. A. Gardner	176
BLACK SPOT OR ANTHRACNOSE OF VINE	W. M. Carne	178
FRUIT-FLY—DESTRUCTION BY SOIL INSECTICIDE ...	L. J. Newman	183
WINTER FRUIT-FLY	L. J. Newman	184
PASTURES—HOW PHOSPHATIC MANURES IMPROVE COMPOSITION OF FODDER	G. K. Baron-Hay	185
FALLOW COMPETITIONS—		
(A) WONGAN HILLS AGRICULTURAL SOCIETY ...	I. Thomas	194
(B) MT. MARSHALL, NUNGARIN, AND BRUCE ROCK AGRICULTURAL SOCIETIES	H. Rudall	196
EXPERIMENTS AT THE CHAPMAN EXPERIMENT FARM MULCHING EXPERIMENT. WHEAT VARIETY TRIAL. LATE AND EARLY FALLOW. OAT VARIETY TRIAL.	I. Thomas and P. Jeffrey	202
EXPERIMENTS AT THE MERREDIN EXPERIMENT FARM MULCHING EXPERIMENT. WHEAT VARIETY TRIAL. LATE AND EARLY FALLOW. OAT VARIETY TRIAL.	I. Thomas and J. H. Langfield	204
BRANDING OF STOCK	A. E. Arnold	212
TESTS TO DETERMINE THE PRESENCE OF ARSENIC IN APPLES AFTER TREATMENT WITH ARSENICAL SPRAYS	Geo. L. Sutton	221
WHEAT YIELDS COMPETITION	I. Thomas	226
KAFFIR CORN	W. T. Richardson	232
FRUIT EXPORT FROM WESTERN AUSTRALIA—SEASON 1926	G. W. Wickens	233
THE AUSTRALIAN MERINO HAS NOT DETERIORATED ...	Geo. L. Sutton	237
CAPE TULIP (HOMERIA COLLINA) VAR. MINIATA ...	J. F. Filmer	240
SAN JOSE SCALE	G. W. Wickens	244
COPPER POWDERS FOR THE PREVENTION OF BALL SMUT IN WHEAT	Geo. L. Sutton	246
POTATO CHIPS	G. N. Lowe	254
POULTRY NOTES	W. T. Richardson	257
PHOSPHATIC FERTILISERS AS MANURE FOR GRASS LAND	A. B. Adams	259
THE ORANGE RUST MITE	L. J. Newman	262
HERD TESTING	... ...	264
THE OBJECTS AND CONDITIONS OF FARMERS' TRIALS	Geo. L. Sutton	267
HORTICULTURAL NOTES	G. W. Wickens	269
FARMERS' FIELD TRIALS	H. Rudall	272
OAT VARIETY TRIALS— BIRD'S-EYE VIEW OF THE FALLOW AT HOPWOOD'S FARM, BENCUBBIN MULGA VARIETY. WILGA VARIETY. FALLOW COMPETITIONS; EXAMINING THE FALLOW AT HOPWOOD'S FARM, BENCUBBIN PLOT OF LUCERNE—T. O. WEYMAN'S FARM, BENCUBBIN	Illustrations	
FERTILISER EXPERIMENTS WITH POTATOES AT YOUNG'S SIDING	G. N. Lowe	276
THE COOKING OF MEATS	Miss M. A. Wylie	282
RETURN OF WHEAT PRICES	C.I.F. & E., London	285
LIVE STOCK AND MEAT	... ...	286
MARKET REPORT	... ...	287
METEOROLOGICAL INFORMATION	... ...	289

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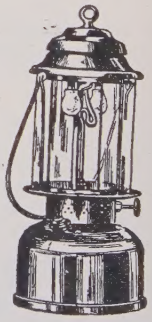
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JOURNAL

OF THE

Department of Agriculture

OF

WESTERN AUSTRALIA.

Vol. 3. (Second Series) JUNE, 1926. No. 2.

FRUIT-FLY AND ITS EFFECTIVE CONTROL.

In the beginning, man was given dominion over all the beasts of the field, and the birds of the air, and everything that had life; even to the creeping things that crawled over the face of a universe warm from the creation. His instructions were unequivocal. He was bidden go forth and multiply, and to subdue all the lower animals. Aeons have since passed during which period man has multiplied, has been almost extirpated, and has again multiplied; furthermore, he has multiplied his flocks and his herds, and in compliance with the Scriptural injunction has succeeded in subduing—to a great extent at least—the beasts of the lower creation. But in respect to the creeping things; those that crawl about, and fly, and are nefariously and persistently engaged in the destruction of man's industry and nature's gifts—aye, and man himself in some cases, for what greater menace to life and health is there than the common house-fly?—it is safe to assert that he is still more than ever employed in the work of subjugation.

Whether the Garden of Eden, prior to the fall of our first ancestor, was immune from the attacks of those devastating pests that now-a-days make the orchardist their incessant antagonist, is not mentioned, suffice it for us to know that for but a brief period he enjoyed Arcadia ere he brought upon himself the edict that henceforth he should live by the sweat of his brow. It were idle to blame the lady in the case. If she proved succumbent to the wiles of the serpent, man's alleged superiority should have proved his fortitude to withstand temptation. His punishment was that the earth's future productivity would be dependent upon his tillage, and, subject to Providential blessings, proportionate to his efforts. To-day he is called upon to exercise not only his energy but his ingenuity in an interminable conflict with insect pests and other plagues.

Amongst those which encompass the greatest havoc in the orchard is the hated Fruit Fly, *Ceratitis Capitata*, to give its truly entomological name.

It is not affirmed that Western Australia has the unenviable distinction of being the first State to introduce the pest into the Commonwealth, but it was here first reported from Guildford in 1897, according to Mr. L. J. Newman, the Government Entomologist, in his Bulletin No. 122 on this subject, and in the following year it was also discovered in New South Wales and Queensland. The New Zealander, however, ascribes to us the mortification of its sponsorship, for in those islands it is known as the "Western Australian Fly." Fortunately for our peace of mind earlier records date back to 1826 when it first made its known *debut* in Europe, which has earned for it, in other parts of Australasia, the title of "Mediterranean Fruit-fly."

Whilst periodic visitations have occasioned the fruit farmer and the Department of Agriculture deep concern, the worst outbreak that has yet been known since 1914-15 is that which occurred last season; not only in respect of the quantity of fruit destroyed, but also because it spread more widely through districts previously clean. It is a consoling fact, however, that in the intervening years we enjoyed comparative freedom from its presence, for it emphasises the important feature that the pest can be controlled. And this is a case where what can be done, *must* be done. We should have no great trouble with the Fruit-fly. We have studied its life history, and we understand it; consequently we can apply systematic and scientific methods to subdue it. That we may not altogether control it is due to special and peculiar circumstances. Inspection must necessarily be incomplete, else we must have an army of Inspectors, and limit or abolish the home orchard. It is not desirable that either course should be followed. The enlightenment of those who are ignorant of its appearance, its effects and habits, and the co-operation of intelligent growers, are all that is necessary to assure control. Given a spirit of sweet reasonableness and a desire to work for the common good, and the fruit-fly need never become firmly established in our State.

What can be accomplished in opposing these infestations has been clearly demonstrated by our successful campaign against the Codlin Moth, the last outbreak of which appeared wide spread and presenting formidable difficulties of control because of isolated orchards, and townships where small plots of fruit trees were planted mainly for home consumption. Had faint hearts attacked the problem when it first occurred, it is conceivable that one of our most important industries would to-day be burdened down with very heavy additional and annual expense. But a realisation of what its depredations meant ultimately to the fruit-growers of the State; an awakening of that part of the public conscience to a clearer perception of its duty; a combination of the science and skill of the expert with the effort and will of the husbandman, and the Codlin Moth, despite its fearsome reputation, its demands for sacrifice, and the croakings of the jeremiads, went under. It was controlled. Having been controlled it has come again and yet again, but the evidence is incontrovertible that its re-appearance has always been caused by a fresh outbreak, probably imported, and never by a recrudescence.

At Spearwood and Jandakot the growers, with the assistance of the Fruit Branch of the Department of Agriculture, threw themselves heart and soul into an effort to stamp out the Fruit-fly, which threatened to destroy not only their means of livelihood but, if not curbed and brought to a stand, must have spelled disaster to an industry throughout the whole State. It was a remarkable achievement, and our orchardists have built up a reputation they are in honour bound to maintain. Like the famous old regiments of our armies they have now a tradition that they dare not sully. Let no man be the first to tarnish its standard through fear or indifference. Does the simile appear exaggerated? Remember the fable of the Bull and the Fly, and that flies can destroy armies. The creeping, crawling, sometimes invisible germ can do more to destroy the mightiest creation of man's hand and brain than the cannon or the sword; slower, perhaps, certainly none the less sure. Famine and pestilence can claim their victims by millions, and famine and pestilence can result from apparently insignificant and microscopic insects. It is always the little things that matter in the long run.

That the importance of dealing effectively with these pests has been recognised by our legislators is evidenced in the amendment to the Plant Diseases Act passed in December of last year, a digest of which was published in our issue of that month. Prior to the ratification of these amendments it was necessary that an Inspector should serve notice on the owner or occupier of any orchard where disease was found to exist. By the amendments now made, however, he is empowered to prosecute at once any owner of an infested orchard where action has not been taken to combat the disease. This power has been responsible for quite a number of prosecutions that have taken place in the Metropolitan Area, where the orchards, being mainly non-commercial, are most liable to be breeders of pests. It is the firm intention of the Department of Agriculture to rigidly enforce, both in commercial and non-commercial orchards, the Regulations made under Section 8a, and who can complain against that determination. It is but just that the careful grower shall be protected against his careless contemporary. It has been argued that experts should take the responsibility of examining and advising the orchardist. Advice, when sought, is gratuitously and willingly offered on all occasions; but there is a limit to the taxpayer's ability to provide tuition to any industrial section of the community. To quote the remarks of the Director of Agriculture, in which the Minister (Hon. M. F. Troy) has concurred:—

> "If fruit-growers are entitled to be visited regularly in order to force them to carry out routine work in connection with the control of pests, then it can be claimed that each sheep-grower is entitled to have an Inspector visit him regularly in order to see that he controls sheep pests, and similarly the wheat-grower . . . . . The time has now arrived when the fruit-growers and other producers should be expected to develop a greater sense of their responsibility . . . . . Those who fail to do so, and neglect to carry out that part which deals with con-

trol of pests which might become a menace to their neighbours should be dealt with summarily in a Court of Law, and the penalty should be exemplary.''

Earnest thinkers will find no fault with the logic of that statement. Ignorance is no excuse for neglect. Much has been written on this subject in this Journal from time to time, and in the Bulletin already referred to in this article, the Government Entomologist (Mr. Newman) has dealt exhaustively with the Fruit-fly pest and the best means for its eradication. There is no parasite for it yet discovered. Co-operative measures are the best measures for its elimination; foliage baiting and trapping, combined with the destruction of all infested fruits should be systematically carried out at all seasonable times.

Spasmodic attacks are futile. The enemy lines cannot be smashed by the short, mad rushes of a handful of men; the whole line must advance in a solid phalanx, dogged and determined. If the fruit-growers of the State adopt that method, and persistently, consistently and concertedly press forward, the campaign against the Fruit-fly in this State cannot fail.

"THE JOURNAL OF AGRICULTURE"

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BULLS AND BUTTER.

P. G. Hampshire, H.C.D.,
Superintendent of Dairying.

To the average reader of dairying matters in the Journal, the title of this article may appear somewhat incongruous, whereas, to the student of dairy cattle breeding, the terms "Bulls and Butter" will have a very obvious relationship. In selecting this subject the writer has the principal reason in mind, namely, to interest both types of readers, and it is hoped

Guernsey Bull
owned by Dairyman J. Ball, Group 6.



"Donnington Lad of Minnamurra."
Reg. Vol. V., G.H.B.

There are 62 Guernsey Bulls in use with average production on the part of 177 female ancestors of 500lbs. butter per lactation. (A brother of the above bull was champion Guernsey Bull at the Brisbane Royal Show.)

(See Table II.)

that the subsequent matter will be found to be a further contribution towards the general knowledge of the student of animal breeding, and the presentation of it such as will be easily understood by the dairyman who realises that increased butter production is necessary if he is to succeed.

Jersey Bull.
Reg. Jersey H.B.



The Government has supplied 41 Jersey Bulls. The average production of 73 female ancestors of these bulls is 448 lbs. of butter. All Jersey bulls have been procured from W.A. breeders.

The most potent factor in the dairying industry to-day and the effective reply to the increased *cost* of production is increased *average* production of dairy herds. The dairy sire which has in his "close up" female ancestry high butter production becomes of utmost importance in attaining this end. By increasing the average yield of a herd of cows by a system of constructive breeding or herd building, the dairy farmer turns what may have been a loss into a profit, or what may have been a bare living into affluence.

A sound policy of herd building has as a base the rock of milk and butter productivity on the part of the ancestors of the pure bred herd sire. All other necessary factors in attaining heights of production, such as good management, complete and economical feeding, and systematic testing are additional stones in the structure. Good breeding forms the foundation, and means "purity" and "production backing."

Milking-Shorthorn Bull
owned by Dairyman C. J. McGann, Group 30.



"Problem of Kurrawong."
Reg. Vol. VII., M.S.H.B.

There are 98 Milking-Shorthorn Bulls in use, with average production on the part of 217 female ancestors of 8,710 lbs. of milk and 451 lbs. of butter per lactation. (see Table II.)

The Government of Western Australia has initiated a definite policy of dairy herd improvement, and the scheme adopted sets out the use *only* of pure "tested" bulls and the confining of each breed of bull to a zone, thus providing a continuity of policy in "grading up."

The qualifications of the bulls being distributed are:—

1. Purity of breeding—Herd Book registration.
2. The progeny of cows with officially tested butter production above standard, and
3. Sound constitution and breed type.

ZONE BREEDING.

In this article it is not proposed to deal exhaustively with this aspect of herd improvement, as much has been written already in this regard, but, briefly, it means the selection of a breed dairy sire to "grade up" cattle most suited for the district climatically and from the point of view of the sale of the product, be it milk or butter, and confining the breed selected to the zone, thereby carrying out systematic "grading up" of the stock reared in that zone.

An additional great advantage is the facilitation of the exchanges of dairy sires in the zones, owing to their proximity; the advantage dairy farmers have in observing the progeny of different bulls before arranging exchanges with nearby neighbours, and the avoidance of freight charges in the transport of bulls from place to place, together with the elimination of forced sale of bulls when changes are necessary. In this regard, already a start has been made in bull exchanges, and dairymen who have commenced herd improvement, using the sires above mentioned, are most enthusiastic in securing similar breed and "production" bulls in the further improvement of their stock.

An additional advantage of zone-breeding is the encouragement of breed enthusiasm, and the assistance it is to country agricultural societies resulting in big classes at their shows.

TABLE I.

WHAT ARE STANDARD TEST BULLS.

Standard of Production for Dams of Bulls.

Heifers on 1st Calf	200 lbs. Butter	273 days under Official Test.
Cows under 4 years	250 lbs. Butter	273 days under Official Test.
Mature Cows	300 lbs. Butter	273 days under Official Test.

TABLE II.

BULLS.

Number, Breed, and Butter Production of Female Ancestry of Registered Pure Bulls at present in use.

Breed.	Number of Bulls.	Number of Tested Dams.	Number of Tested Sire's Dams.	Number of Tested Dams' Dams.	Number of Tested Grand Sire's Dams.	Number and Average of Tested Female Ancestors.
	62	62	49	32	34	177
GUERNSEY	Average Butter Production	405 lbs.	634 lbs.	363 lbs.	606 lbs.	500 lbs.

Breed.	Number of Bulls.	Number of Tested Dams.	Number of Tested Sire's Dams.	Number of Tested Dams' Dams.	Number of Tested Grand Sire's Dams.	Number and Average of Tested Female Ancestors.
	41	41	18	8	6	73
JERSEY	Average Butter Production	443 lbs.	480 lbs.	455 lbs.	348 lbs.	448 lbs.

Breed.	Number of Bulls.	Number of Tested Dams.	Number of Tested Sire's Dams.	Number of Tested Dams' Dams.	Number of Tested Grand Sire's Dams.	Number and Average of Tested Female Ancestors.
MILKING SHORTHORN	98	98	57	25	37	217
	Average Butter Production	353 lbs.	458 lbs.	396 lbs.	513 lbs.	412 lbs.

	Number of Bulls.	Number of Tested Dams.	Number of Tested Sire's Dams.	Number of Tested Dam's Dams.	Number of Tested Grand Sire's Dams.	Number and Average of Tested Female Ancestors.
ALL BULLS	201	201	124	65	77	467
	Average Butter Production	387 lbs.	530 lbs.	390 lbs.	541 lbs.	451 lbs.

Note: All figures are based on 83 lbs. fat = 100 lbs. Butter.

This table sets out the number of bulls of each breed in use in this State, which were supplied by this Department.

The total number of bulls distributed is 201, and the above table shows that *all the dams of these bulls* have been tested and have an average production of 387 lbs. of butter. From a further examination it will be seen that 124 sires' dams have been tested, and have an average production of 530 lbs. butter. Again, 65 of the dams' dams have reached 390 lbs. butter; and 77 of the sires' grand dams have an average production of 541 lbs. of butter. The average of all the female ancestors which have been tested, numbering 467, is the splendid one of 451 lbs. butter per lactation period. A closer examination points out the number of female ancestors tested, the average of each breed, and the number and average butter production of the dams, sires' dams, dams' dams, sires' grand dams of each breed.

As a further evidence of the "butter backing" these 201 bulls have, it may be pointed out that in one lactation period, on the part of the female ancestors, 210,700 lbs. (nearly 100 tons) of butter have been produced by the dams of the bulls.

It may be interesting to admirers of the Guernsey breed to know that 52 of the 248 Guernsey bulls registered in the "Guernsey Herd Book of Australasia," Volume 6, recently issued, are included in the above table.

In regard to the milking Shorthorn bulls shown in this table, which have been placed in a zone from where it is expected the bulk of the milk required for the city of Perth will be produced, the average milk production of the female ancestors of these milking Shorthorn bulls is as follows:—

Dams . . . . . 735 gallons.
Sires' Dams . . . . . 964 „
Dams' Dams . . . . . 825 „
Grand Sires' Dams . . . . . 1,071 „

Average *all* Female Ancestors—871 gallons.

PEDIGREES.

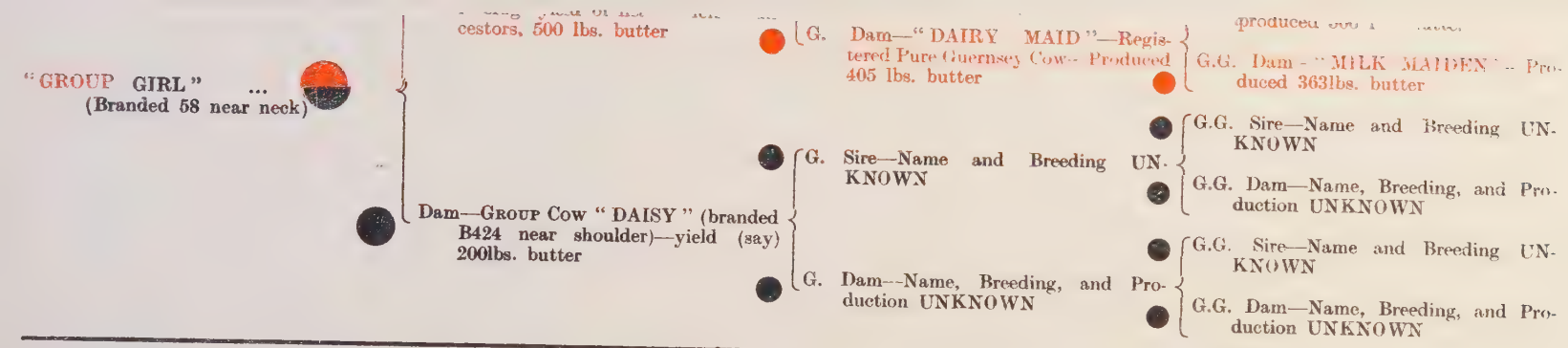
The Production Ancestry of the average Guernsey Bull being used reads thus :—

"WESTRALIAN HERD IMPROVER" —Average yield of nearest female ancestors, 500 lbs. butter per lactation period under Official test (*see* Table II. 62 Guernsey Bulls)

- Sire—"CREAMERY PRINCE" ...
  - Sire's Sire—"BUTTER KING" ...
    - Sire's G. Sire—"DAIRY KING" Registered Pure Guernsey Bull.
    - Sire's G. Dam—"BUTTER GIRL" Registered Pure Guernsey Cow. 34 tested average 604 lbs. Butter per lactation period. Official Test.
  - Sire's Dam "MILK LADY" 49 tested average 634 lbs. butter per lactation period. Official test.
    - G.G. Sire—Registered Pure Guernsey Bull.
    - G.G. Dam—Registered Pure Guernsey Cow.
- Dam—"DAIRY MAID"—All tested officially and average 405 lbs. butter per lactation period.
  - Dam's Sire—"CREAM DUKE" ...
    - G.G. Sire—Registered Pure Guernsey Bull
    - G.G. Dam—Registered Pure Guernsey Cow
  - Dam's Dam—"MILK MAIDEN"—32 tested average 363 lbs. butter per lactation period. Official test
    - G.G. Sire—Registered Pure Guernsey Bull
    - G.G. Dam—Registered Pure Guernsey Cow

The Genealogical Tree or Pedigree of the first grade Guernsey Heifer bred on Group Settlements :—

- Sire—"WESTRALIAN HERD IMPROVER" (branded 58 near neck)—Average yield of nearest female an-
  - G. Sire—"CREAMERY PRINCE"—Registered Pure Guernsey Bull
    - G.G. Sire—"BUTTER KING"—Mother produced 606 lbs butter
    - G.G. Dam—"MILK LADY"—Produced 634 lbs. butter
  - G. Dam—"DAIRY MAID"—All tested officially and average 405 lbs. butter per lactation period.
    - G.G. Sire—"CREAM DUKE"—Mother [illegible] 500 lbs. butter



The Result of (approximately) Nine Years "Grading up" with One Breed—Guernsey :—

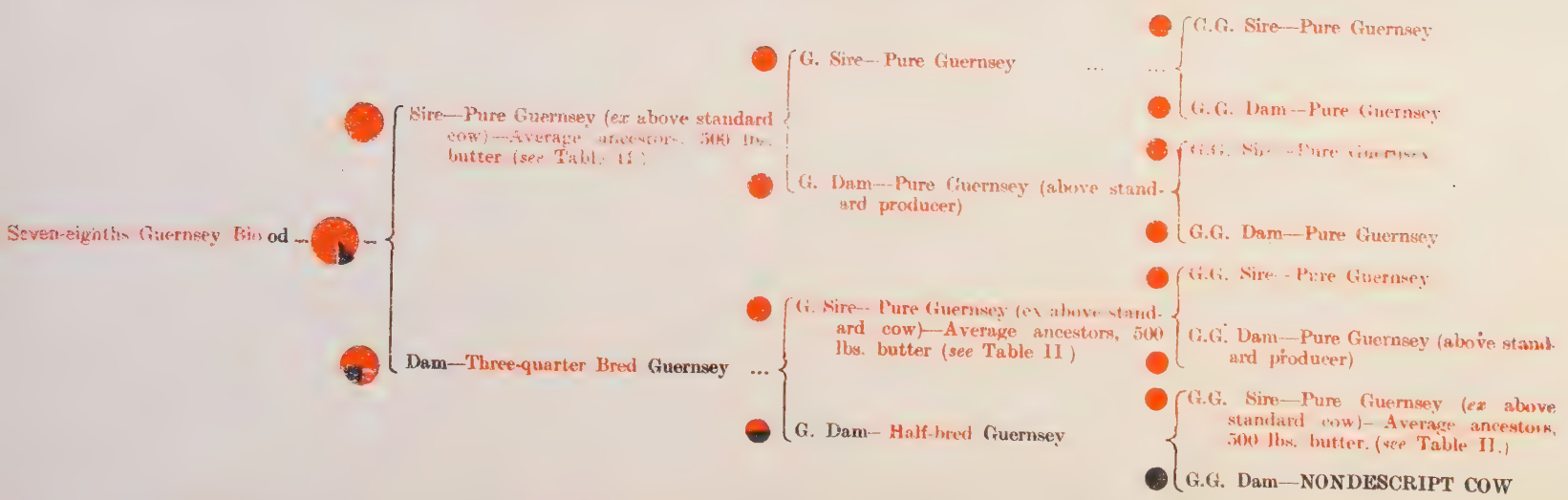


TABLE III.

How the Bulls are Distributed.

	Guernsey.	Jersey.	Milking Shorthorn.	Total.
Group Settlements	55	36	81	172
Agricultural Bank Clients	7	5	17	29
Totals	62	41	98	201

TABLE IV.

WHAT ONE BULL BEING USED HAS DONE.

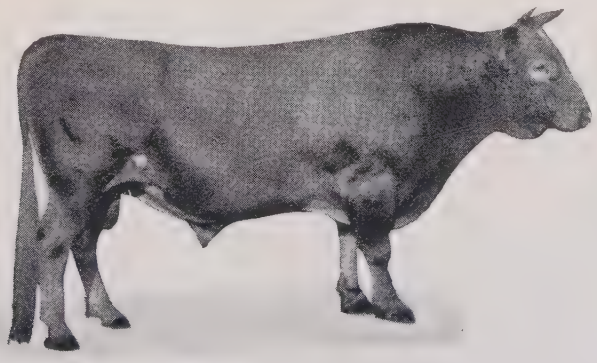
Guernsey Bull "Rose Chief of Wollongbar," Reg. No. 130 G.H.B.

Official Production Results of 20 (*all*) *tested Daughters compared with their Dams.*

Dams.			Daughters.			Increase.	
No.	Particulars.	Butter	No.	Particulars.	Butter	Butter	Per cent.
		lbs.			lbs.	lbs.	
12	Tested on 1st Calf—Average	260	19	Tested on 1st Calf—Average	348	88	33·8
7	Tested up to five years Average	306	11	Tested up to five years Average	463	157	51·3
12	Tested on 1st Calf—Average	260	12	Daughters of these Cows on 1st Calf Average	372	112	43·0
7	Tested up to five years—Average	306	7	Daughters of these Cows tested up to five years—Average	445	139	45·4
1	Not tested	...	1	Daughter tested at 4 years	608	...	...
19	Average Production of Dams	277	31	Average Production of Daughters	399	122	44·0
		%			%	%	
19	Average Fat Test of all Dams	5·12	20	Average Fat Test of all Daughters	5·82	·70	13·6

This table effectively shows the great value of the above dairy sire. In each case it will be seen that there is a considerable increase in the average butter production of the daughters of this bull over that of their dams, the results ranging from 88 lbs. to 157 lbs. of butter more than that of the

A Proved Dairy Sire.



"Rose Chief of Wollongbar."
(See Table IV.)

mothers. Another interesting feature is the fact that the average butter fat test of the daughters of this bull is .7 per cent. higher than the average butter fat test of the dams. This, probably more than any other factor, shows the marked prepotency and dominance of this sire in regard to butter production, and it should be easy for dairymen to visualise what a bull of this character would mean to them if he were in their herds. Incidentally it might be pointed out that this bull is the sire of the champion Guernsey bull and cow at the Royal Agricultural Show, Sydney, 1925-1926. The dam of "Rose Chief" is still alive at the ripe age of over 22 years.

THE COST OF BULLS AND THEIR VALUE.

If one were talking to a business man about herd improvement, he probably would say "What will it cost ?" and "What will be the return ?" To meet this point of view the following estimate is provided :—

201 bulls at an average cost of £38 each. Total, £7,638.

Using 1 bull per 50 cows per annum, and, after making due allowances for male calves and losses, it is reasonable to assume that 20 heifers will be reared per annum. Therefore, 201 bulls mated to 10,050 cows is equal to 4,020 *graded daughters per annum.*

Assuming the average working life of these 201 bulls to be 4 years, this would mean 16,080 *graded daughters.* These should be worth, on an average, £3 more than their nondescript dams and, therefore, will be worth £48,240 more than their mothers.

It is reasonable to expect that the 16,080 graded daughters will average five lactation periods each, thus we have 80,400 lactation periods, which again, one could expect, should yield an increase of 40lbs. of fat more than that of their nondescript dams, having in mind that the 201 bulls being used have female ancestry whose average production was 451lbs. of butter, as shown in Table 2. Thus, 80,400 lactations at 40lbs. fat increase, at 1/3d. per lb., is equal to £201,000 *sterling*, making a total of £249,240 *sterling*. Allowances must be made for additional losses, failures and deaths, and on a conservative basis 19 per cent should be sufficient, amounting to £47,355, thus the 201 bulls mean an added value of £201,885.

EACH BULL IS WORTH £1,000.

In making the above estimation the writer has worked on the following figures :—

1.	One bull per 50 cows per annum.	
2.	Deduct 20 per cent. for failure to breed, accidents, deaths, etc.	
3.	Deduct 50 per cent. for male calves.	
4.	Average bull's breeding life, 4 years.	
5.	Each bull breeds 80 *graded daughters.*	
6.	Grade daughters worth £3 more than scrub mothers	£240
7.	Grade daughters average *five lactations each.*	
8.	Grade daughters average 40*lbs. butter fat at* 1/3*d.* more than dams ...	£1,000
		£1,240
9.	Deduct 19 per cent. for additional losses, failures and deaths	£235
10.	Nett worth of each bull	£1,005

THE FUTURE.

From the foregoing tables it is possible to estimate what the future will mean in increased production and increased value of the stock as the result of the policy adopted. With the complete development of the present 2,500 group farms, allowing that each farm when fully developed will carry on an average 30 cows, and making allowances for the development taking place on dairy farms other than group farms, it is reasonable to expect that, in the course of a few years, over 100,000 cows will be bred to "standard test" bulls and the policy of "grading up" continued.

WHAT HAS BEEN DONE IN OTHER PARTS OF THE DAIRYING WORLD IN HERD BUILDING.

The figures of the South Dakota State Herd are very illuminating:—

Year.	Number of Cows in Milk.	Daily Average Milk.
		lbs.
1913	40	19·8
1914	37	23·0
1915	39	23·1
1919	58	30·3
1922	47	46·4
1923	67	50
1924	70	50·1
1925	76	51·7

The above figures represent, on 1st January in each year, the number of cows in milk and the daily average of milk in pounds. This is a remarkable instance of increased average production following the continued use of pure bred dairy sires with high production on the part of their female ancestry.

IN THE GUERNSEY ZONE.

"Grading-up" to Pure Guernsey.



A Grade Cow, the property of Dairyman Prosser, Group 31, with heifer calf, the progeny of the Guernsey Bull "Roland of Koojan" owned by Dairyman Abbott, Group 31, Jarnadup.

The present herd sire in use has an average yearly production of 29,805 lbs. milk on the part of the two nearest dams.

Further interesting data shows that, in the case of one cow who produced 670 gallons of milk, her daughter by a sire with high production ancestry produced 1,572 gallons of milk.

In the year 1920 89 cows in this herd produced 63,857 gallons of milk, with an average of 700 gallons per cow. In 1922 69 cows were milked and produced 68,460 gallons of milk, with an average of 1,000 gallons of milk per cow. In other words, this herd with *20 cows* less produced *46,027 lbs.*

more milk during the year. This is a remarkable instance of "grading up" an ordinary herd by using pure dairy sires which have high production female ancestry.

Another case worthy of note is that of Mr. Grut Hansen, of Kolle Kolle, near Copenhagen, who, in 1900, had a herd of 60 cows with an average test of 3.3 per cent. The Milk Testing Association's books showed bulls with daughters with high fat test. Hansen procured and used several of these bulls in succession and, in 1914, the fat test of the herd was 4.2 per cent., whilst the milk yield was not less than that of 1900.

IN THE JERSEY ZONE.

"Grading-up" to Pure Jersey.



A Grade Cow and her Heifer by a fine Jersey Bull.

Andrew McCandlish, B.Sc. (Agric.), West Scotland Agricultural College, in a paper read at the Scottish Cattle Breeding Conference, July 1924, says:—"When all the second generation grades are considered it is found that they have an average production of 8,413.3 lbs. of milk and 376.35 lbs. of fat, as compared with an average record for their scrub grand-dams of 4,008.7 lbs. of milk and 187.40 lbs. of butter fat. This is an average increase of 110 per cent. in milk and 101 per cent. in butter fat production in two generations. No selection of the animals has been practised, and

every individual in the second generation of grades is a much better producer than her scrub grand-dam. This certainly vindicates the use of *good pure bred dairy sires* in 'grading up' low producing or 'scrub herds.'

THE MILKING-SHORTHORN ZONE.

"Grading-up" to Pure Milking-Shorthorn Bulls.



A fine batch of "Graded-up" Milking-Shorthorn Heifer Calves on the Peel Estate Group Settlements Area.

"High production is not enough—the average dairyman demands economy of production. Throughout this trial feed records were kept during both lactation and dry periods. By taking the total amount of feed consumed by a cow from the time she entered the producing herd until she was disposed of, and applying average prices, the relative feed cost of production can be

The influence of the Pure Dairy Sire.



This heifer's mother is a brindle nondescript cow. The sire is a standard Milking-Shorthorn bull.

obtained. In this way the average feed cost of milk and butter fat production for the various groups has been obtained. The second generation grades were the most economical producers of both milk and butter fat, while the scrubs were the least economical, so the use of pure bred sires brought about not only greater production but also more economical production."

He further states that, as an indication of the value of increased unit production, the feed cost of production, in the case of scrub cows, is 8¼d. per gallon of milk and 1s. 5½d. per lb. of fat, while, in the case of their grand daughters, the feed cost is 5¾d. per gallon of milk and 1s. 0½d. per lb. of fat.

Dr. G. F. Finlay, Ph.D., of the Animal Research Department, Edinburgh, says, "the practice of 'grading-up' is based on sound principles and justifies national encouragement."

Edward N. Wentworth, Director of Armour's Livestock Bureau, Chicago, in an article on "Genetics and Practical Cattle Breeding," states that "the value of high grade animals is three times greater than that of scrubs, and that 'grading up' is the chief method employed in improving commercial herds."

The value of a pure bred bull over the scrub bull is essentially greater for two reasons:—(1) The better individual; (2) he will breed true.

In cases where the scrub and grade are equal in appearance, the pure bred is always better in that he will breed true.

D. Kislovsky, of the Animal Breeding Department, Moscow, states that "in mass breeding the use of pure bred sires to 'grade up' is the plan being adopted for the restoration of cattle in Belgium."

IN THE GUERNSEY ZONE.



Grade cow and her heifer calf, the progeny of Guernsey Bull "Oliver Twist of Minnamurra," all owned by Dairyman Wilson, Group 24 (near Cape Leeuwin).

MANAGEMENT, IDENTIFICATION, AND RECORDING OF BULLS, COWS, AND CALVES ON GROUP SETTLEMENT AREAS.

At the holding grounds which have been established, the bulls, subsequent to purchase, when necessary, are built up into good, strong, working condition, nose ringed, handled, and taught to lead prior to despatch to the group settlement areas.

For the purpose of record and easy identification a system of marking of the bulls, cows, and their progeny has been instituted.

All the bulls are fire-branded with two-inch numerals representing the official number on the near neck. This number is noted on the cards which are kept at head office, and on these cards is recorded also full particulars

in regard to the breed, age, colour, brands, production ancestry, and location of each bull. The bulls are inspected from time to time, and a brief report on the animals' condition and progress is entered.

All cows on group settlements are also officially numbered on the near neck with a system of letters and numerals.

Calves, the progeny of group settlement bulls, are branded on the near neck with a number corresponding with the number of the sire. This enables identification of the sire and dam of each "graded up" heifer bred on group settlements, and, as time goes on, it permits of a reasonably accurate record being kept of the breeding qualities of the dairy sires being used. This, in addition to the test result of the cows being kept, will still further permit of records being available to indicate the progressive improvement of the "graded up" progeny of the ordinary cows supplied to the groups.

IN THE MILKING-SHORTHORN ZONE.



Grade cow and her heifer calf, the progeny of Milking-Shorthorn Bull "Doncaster of Gobbagumblin."
Vol. VII., M.S.H.B.

THE TESTING OF COWS.

The testing of group herds where they number 10 cows or more has been commenced for a threefold reason:—

1. Educational value.
2. With the view of eliminating the unprofitable animals.

3. In order that a record of the dams of the stock bred on group areas may be available so that the breeding improvement, as the result of the bulls being used, may be ascertained.

The method adopted in order that a large number of herds may be tested at the cheapest possible cost with a reasonable degree of accuracy is as follows:—

Group dairymen are instructed in weighing the milk of the cows night and morning, the entering of weights on special forms supplied, and in the taking of samples correctly over a period of 24 hours once per month.

An adviser of the Dairy Branch visits each farm once per month, collecting the samples and records of yields, taking the samples to a field laboratory where they are tested and computations made. The report of results is handed to the group dairy farmers when the officer is also available to advise the dairy farmer in regard to the feeding and handling of the stock. Provision also is made for a record to be kept of the feeding of the cows each month.

HOW PURE "TESTED" BULLS MAY BE OBTAINED.

1. The Group Settlement Department supplies one bull per 50 cows, allocating the bulls to approved settlers. The cost of the animal is charged to the holding, the settler making a uniform charge of 10s. per cow per service, to adjoining settlers.

2. Agricultural Bank clients may apply for an ordinary bank loan for the purchase of a bull, which must be an approved bull, namely, registered pure ex-tested dam with production above standard, and of a breed according to the zone in which the farmer resides.

3. A special vote is available by the Department of Agriculture for the supply of bulls to dairy farmers in cases where farmers are unable to negotiate a loan from the Agricultural Bank. After inspection of the property held by the applicant and dealing with particulars regarding the advisability of complying with the request, on the Hon. Minister's approval, the Department supplies an approved bull on terms of six half-yearly payments covering three years.

BETTER BULLS BREED BUTTER COWS.

STRAWBERRY CLOVER.

(*Trifolium fragiferum*, Linn.)

W. M. CARNE, F.L.S., C. A. GARDNER, and A. B. ADAMS.

Strawberry Clover received its name from a supposed resemblance of the fruiting heads to strawberries. A native of Europe, North Africa, and Western Asia to North-West India, it has proved in parts of Australia to be an excellent pasture plant, particularly for dairy cattle.

It resembles in habit and flower-heads the more widespread White or Dutch Clover (*T. repens*), though a number of differences may be found on closer examination—*e.g.*, the seed-heads, smaller pink flower-heads, and particularly the veining of the leaves. Like White Clover, its stems are prostrate and root from the joints, spreading until the plants form a dense mat of highly nutritious and palatable fodder.

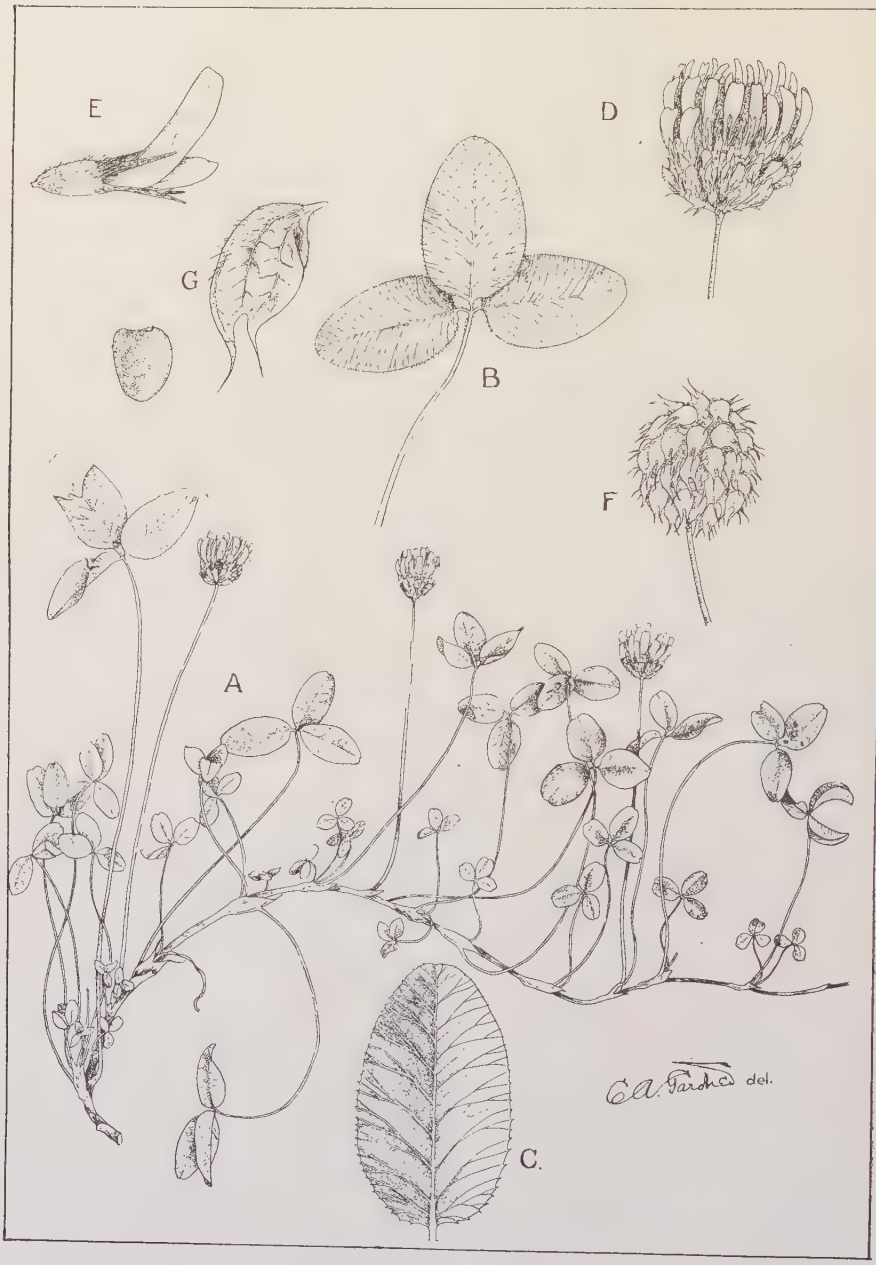
Strawberry Clover thrives on rich river flats, in swampy soils, and in wet places where the soil is not sour and the climate not very severe in the summer. In this State it produces its best growth in the coastal limestone swamps, and in the moist red loam at the base of the red-soil hills in the South-West. A little salt in the soil is not harmful, but the plant does not succeed well under the more acid conditions found in the black sand and peaty swamps, and in such places it is not so valuable as Lotus Major (*L. uliginosus*). Given suitable conditions Strawberry Clover is a perennial, growing during the warmer months of the year. Where it succeeds it adds considerably to the value and carrying capacity of the pastures. It makes with Water Couch, and even Paspalum, an excellent combination, and it will be found that stock will graze the mixed pasture more closely than when it contains only the grasses.

One of the most successful of clover growers in Western Australia, Mr. B. W. Prowse, of Capel, states that Strawberry Clover is, in his district, the "King of perennial clovers, being well adapted to our wet swamp lands which cannot easily be drained, and it will stand being inundated for five months of the year. When the water recedes to a shallow depth the clover spreads over the ground rapidly, rooting at every joint, and providing a succulent fodder at the dry time of the year, when it is so essential to the dairyman. . . . My Strawberry Clover pasture carries five head of dairy cows to the acre from January till May."

As with other pasture plants which thrive in swamps, the binding mat of herbage, and the trampling of cattle seeking it, rapidly tend to kill out rushes and other undesirable plants.

Strawberry Clover is one of the pasture plants which have made South Gippsland, in Victoria, famous as a dairying district. Pastures of the clover over 25 years old may still be found there in excellent condition. In New South Wales a variety known as Shearman's has given excellent results on saline marshy soils near Newcastle. This variety has larger leaves, and makes stronger growth, but, unlike the common clover, does not set seed.

Where they are obtainable, Strawberry Clover is best propagated by roots. In Victoria it is a common practice to cut up clover sod into small pieces which are broadcasted on cultivated land and rolled in, or the roots are hoed in amongst grass. The latter method is best where Water Couch,



Strawberry Clover (*Trifolium fragiferum*, Linn.).

Paspalum, etc., are already established. When seed is used on arable land it is best sown in autumn, in a properly prepared seed bed, at the rate of about two pounds of clean seed per acre. When the land cannot be readily prepared, and the seed is available only in small quantity, it is best to sow a small area, from which the roots may be taken the following year for planting elsewhere. In swamps seed may be thrown upon the mud as the water recedes after the winter rains.

The seed of Strawberry Clover is very small, one pound containing about 250,000 seeds. It is expensive, and costs about 12s. 6d. per lb. Unfortunately a large proportion, even at times as much as 90 per cent., will not germinate without some treatment. These hard seeds may be treated by rubbing them between pieces of sandpaper, or over a piece of flat sandstone with a board, so as to scratch the surface. Scratched seed germinates readily. Seed is sometimes sold in the husk (pod). Clean seed is to be preferred. The best time to sow seeds in arable land is from March to the end of April. Roots may be planted out in autumn or spring.

Once established, the plants are spread by seeds in the droppings of stock. Like all other clovers, in order to obtain the greatest growth and most nutritious feed, regular top-dressing with phosphatic fertilisers is essential. One cwt. of superphosphate per acre, applied in the autumn or spring, will easily repay its cost.

Description of Plant. (See Plate.)

A perennial plant with the habit of White Clover. The leaves have not the white crescent-shaped mark usually borne by White Clover, though there may be brown spots on the younger leaves; and the arrangement of the veins is different, being more curved and spreading outwards from the midrib, conspicuously forked, and each vein projecting beyond the leaf margin in a minute point, giving a very fine saw-like appearance to the leaf margin. The flower-heads are usually smaller than in White Clover, are pale pink, and the individual flowers are not stalked as in White Clover, but closely sessile in the head, and surrounded by a small cup of united brown bracts as long as the lower calyxes. After flowering the calyx becomes inflated or bladdery, and is thin and net-veined, the large upper lip with its two sharp teeth protruding over those of the smaller low lip, and often assuming a pink colour which gives the fruiting head a strawberry-like appearance. The pod is one-seeded. The small seed is roughly triangular, rounded at the apex, and flattened with a slight groove between the two longer sides. The surface is smooth and dull, of a rich yellow to a light brown or green in colour, and mottled with dark green. A brown colour is said to denote old seed. Seed measures 1.5-2 mm. in length, averaging about 2mm. For finer details of the plant see the plate.

Legend.

A. Plant (reduced slightly).
B. A leaf (about natural size).
C. A leaflet (enlarged).
D. Flower head (natural size).
E. A single flower (enlarged).
F. Fruiting head (about natural size).
G. Pod and seed (enlarged).

WOOLLY CLOVER.

(*Trifolium tomentosum*, Linn.)

W. M. CARNE, F.L.S., C. A. GARDNER, and A. B. ADAMS.

This is one of the hardiest of the naturalised annual clovers, found principally on the drier soils throughout the older settled districts of the South-West, and along the Great Southern Railway.

Woolly Clover is a small clover forming a dense circular mat, covered in an advanced condition with the pinkish woolly seed heads from which it derives its name. As a pasture plant it is only of minor importance in good soils where Subterranean Clover or other more valuable legumes thrive. On dry soils, where the smaller annual clovers alone succeed, it is well worth encouraging, since it gives variety to the pasture, and is very hardy. Under these conditions, however, it cannot be regarded as equal to Cluster Clover, and it matures and dies off earlier than the latter.

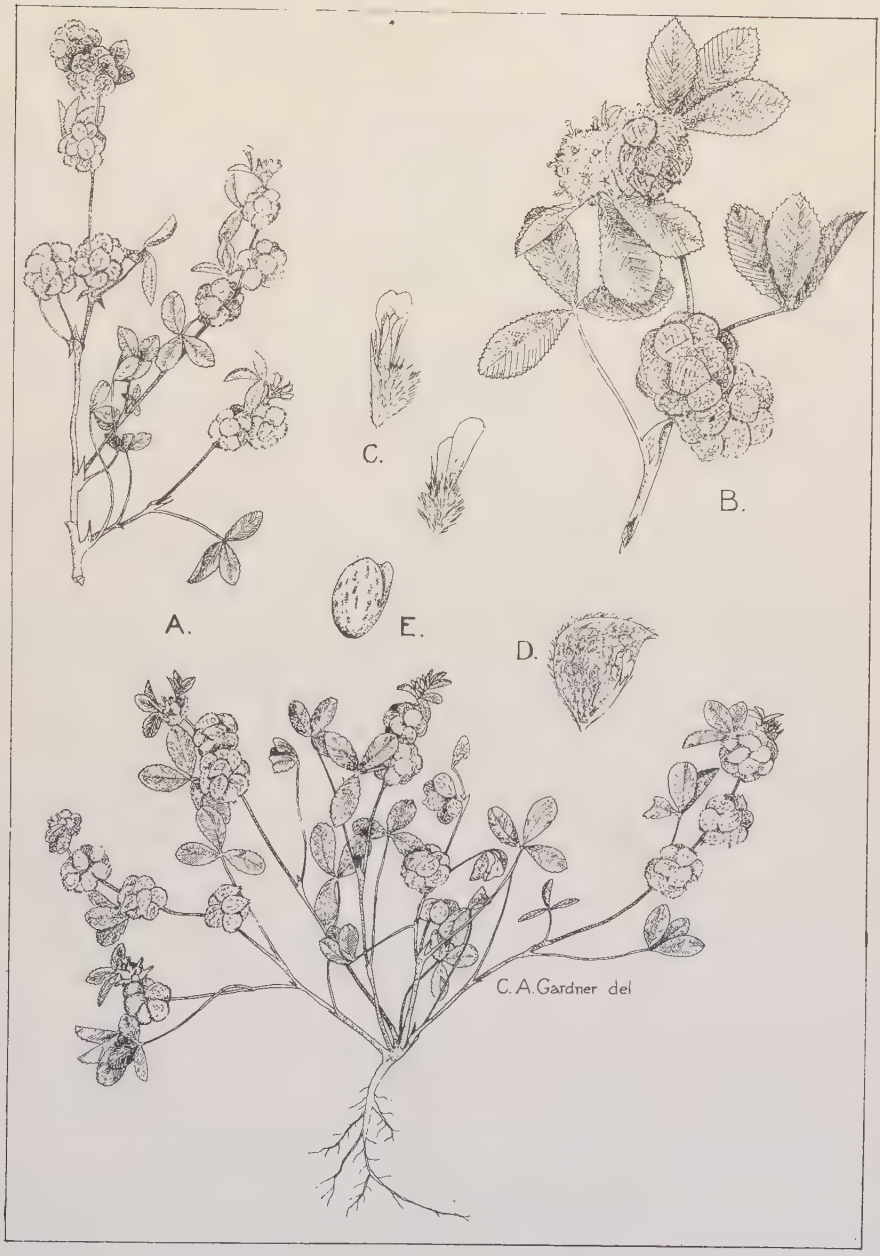
Seeds are not obtainable from local seedsmen, but as they, together with those of Suckling Clover, are usually to be found in country which has been settled for some time, the use of phosphatic fertilisers is sufficient to bring the plant into evidence. An annual top-dressing with about 1 cwt. of superphosphate per acre, in the autumn, should be quickly followed by an increase in the annual clovers in the spring on the drier or lighter soils of the South-West and Great Southern districts. This also occurs in land which has been allowed to revert to pasture after cropping with wheat or oats when fertilised with superphosphate.

Description of Plant.

A diffuse annual plant, spreading to about 18 inches in diameter; hairless except the calyx. Leaflets inverted egg-shaped, finely toothed and finely nerved. Flowers in very shortly stalked heads, very small, pink, reversed so that the standard is outermost. Fruiting-heads much larger than the flower-heads; calyx woolly-hairy, the upper lip swollen into a membranous net-veined bladder, the two teeth very small and almost hidden among the wool. At first woolly-white, the seed-heads upon ripening assume a pink colour. Seeds small, almost egg-shaped with a conspicuous protuberance or short spur, green to reddish-brown, shining and mottled with purple-grey spots.

CATTLE.

"The sire is half the herd or flock." So far as it relates to purebred herds, where each sex has an equal influence, it is true, but where a scrub herd is to be improved by the purebred sire, then the sire becomes more than half the herd, because all blood line improvement must come through that sire.



Woolly Clover (*Trifolium tomentosum*, Linn.).

COMMON AILMENTS OF STOCK AND THEIR TREATMENT.

F. MURRAY-JONES, B.V.Sc., M.R.C.V.S.,
Chief Veterinary Officer.

From time to time many inquiries are received from stock-owners asking for veterinary advice and treatment for sick stock, and with the object of supplying this information in a handy and easily understood manner, these notes bearing on common ailments of stock have been compiled. It is hoped that they will prove of value to those requiring such assistance.

COLIC IN HORSES.

Colic is the manifestation of pain in the interior of the abdomen. It may be due to irritation of the intestines caused by indigestion, sand, worms, enteritis, hernia, calculus, or obstruction.

Flatulent Colic.—This is abdominal pain due to distension of the bowels by gas resulting from undigested food or foods which generate gases, *i.e.*, Clovers. Usually it is due to errors in feeding, watering, and working.

Symptoms.—In this case the symptoms resemble those of Spasmodic Colic, but are less violent, and there is considerable distension of the abdomen, shown by the hollow of the flank becoming filled up and completely obliterated. Owing to pressure exerted by the distended bowels on the lungs and heart, breathing is difficult, and as the lungs cannot obtain enough oxygen the blood becomes deoxygenated and brain symptoms thus occur.

Treatment.—Starve until recovering.

Give Sp. Ammon. Arom., 1 ounce.
Ether nit., 1 ounce.
Warm water, 1 pint.
or
Whisky or Rum, 6 ounces.
Water, 1 pint.

Follow up with—

Linseed Oil (Raw), 1½ pints.
Oil of Turpentine, 1 to 2 ounces.

Spasmodic Colic.—This is abdominal pain accompanied by spasms of the muscular coat of the intestines. It may be due to the irritation caused by undigested food as the result of the teeth being out of order, or it may be due to the horse working too hard or for too long a period.

Symptons.—The first symptoms are usually depression, pawing with a fore foot, looking round at the flank and making attempts to lie down carefully; later rolling, rapid breathing, distress and sweating. At intervals the pain disappears only to return and becomes gradually worse until, if not relieved by medicine, the horse will gradually show a haggard expression of the face, cold and wet surface of the body, and finally die in agony.

Treatment.—Starve until recovering.
Give Aloetic Ball, 5 to 8 drachms.
Chloral Hydrate, 1 ounce.

Also give enemas, exercise, laxative diet. Repeat purgative, if necessary, by giving Linseed Oil, 1½ pints; Oil of Turpentine, 2 ounces.

Sand Colic.—This is abdominal pain due to the irritation caused by sand in the bowels. Horses when not supplied with Rock Salt or put on to sandy paddocks to graze when the green feed is just coming up will eat large quantities of sand. Sometimes the eating of sand is the result of defective bag mangers out of which the chaff becomes spilt and is then eaten off the ground together with sand.

Symptoms and Treatment.—Suspected horses should be kept in a clean yard so that their dung may be examined for sand. Back raking with a well greased arm will often reveal the presence of sand inside the rectum. After administering a dose of linseed oil (raw), 2 pints, and turpentine, 2 ounces, sand will usually be passed in quantity after 24 hours. The same symptoms are present as in other forms of colic with a greater tendency to signs of inflammation of the bowels, *i.e.*, Enteritis. The foregoing treatment may be repeated in pint doses after 24 hours' interval, and soapy enemas may also be given and repeated if necessary. Horses affected with bowel trouble should be starved or given bran mashes only and plenty of water.

ENTERITIS OR INFLAMMATION OF THE INTESTINES.

This is a rapidly fatal inflammation of the mucous membrane of the intestines, due to neglected cases of colic or to other causes such as worms, poison plants, constipation, bacteria.

Symptoms.—Redness of mucous membrane of eyelids and nostrils, high temperature, restlessness, uneasiness, pawing continuously, breathing hard, sweating, pain on pressure with hand on abdomen. There is no relief from pain until just before death occurs. Countenance shows great distress, eye is wild—unnatural stare—nostrils dilated. Shivering occurs and the skin gradually becomes cold all over; lips become pendulous. Pain ceases just before death owing to gangrene of the bowel having set in and then pain can no longer be felt.

Treatment.—Give anodynes to allay pain—Chloral Hydrate, 1 ounce in a pint of water—this may be repeated as required. Apply hot fomentations to abdomen with a blanket. Give warm water enemas frequently; regulate bowels if necessary with Olive Oil 1 pint. Avoid dry foods until recovery takes place. Give small bran and linseed mashes and do not work the animal until a week after recovery.

IMPACTION OF COLON.

This is the accumulation of coarse fibrous or over-abundant food in the colon and caecum accompanied by general abdominal pain.

Symptoms.—There is an absence of defecation and loss of appetite which gradually becomes more pronounced. This trouble is less violent than ordinary colic and appears gradually, the animal sometimes only showing symptoms of loss of appetite and slight pain shown by rising and getting down alternately. When standing the horse will attempt to micturate or

make water without doing so. This act will be repeated several times, leading to the erroneous idea that the horse is suffering from kidney trouble. The urine is darker than normal but becomes normal after recovery of the action of the bowels. On listening to the bowel movement by placing the head against the flank there is an absence of the usual sounds. Horses with this trouble do not usually recover unless treatment is persevered with for a week or two. The first two or three enemas may not be followed by the passage of dung, and must be repeated eight or nine times a day until the food passes through.

Treatment.—Give laxative diet and soapy enemas. Three packets of Glauber's Salts in the feed daily may be given, but in the more severe cases give—

Ammonium carbonate pulv., 2 ounces.
Nux Vomica, 1 ounce.

Make into four balls and give as one dose. This should be followed with—

Raw Linseed Oil, 1½ pints.
Oil of Turpentine, 2 ounces.
Sp. Ammonia Arom., 2 ounces.

Repeat without Nux Vomica, if necessary.

LAMINITIS OR FOUNDER.

This condition is an inflammation of the sensitive or fleshy leaves of the wall of the foot, due to congestion of the circulation. This may be due to one of several causes, *i.e.* long standing on hard ground in hot weather, or the result of an over liberal allowance of grain in the ration, or undue weight being supported by one hind or fore foot whilst the other fore or hind foot is injured and unable to support weight. This disease is also met with after parturition or when animals are approaching parturition, and sometimes follows influenza. It may also be due to excessive work, intestinal congestion, improper shoeing.

Symptoms.—The first signs of this disease are loss of appetite, increased thirst, and unsteady gait. Later the symptoms vary according to whether the fore or hind feet are affected. If laminitis of the fore feet the horse will throw all the weight on the heel and thus has to stretch the fore feet forward; in addition he will relieve the fore feet of as much weight as possible by bringing the hind feet forward under the belly. If the hind feet are affected the horse will endeavour to throw his weight on to the fore feet by drawing these back under the body and lowering the head and neck; at the same time the hind feet are brought forward in an endeavour to place the weight on the heels. The affected hoof will be found to be hot, especially around the wall, and it will be difficult to lift any of the feet off the ground. The artery which runs down the pastern throbs and the legs usually "fill." The horse will refuse to lie down or move. When forcibly moved he appears to have the feet nailed to the ground. The breathing is hurried, membrane of the eye red—due to congestion. If treated early no further developments occur and recovery occurs in a few days; if neglected chronic laminitis with permanent changes in the structure of the foot will occur. Usually if recovery has not occurred by the eighth day chronic laminitis will be present,

and the pedal bone will descend and the wall of the foot become concave, with an excessive growth of hoof at the toe. Haemorrhage between the wall and the bone may produce "Seedy Toe," which is a hollow space between the wall and the bone, and will have to be cut out. The pedal bone may penetrate the sole and the protruding portion sluff away. Chronic cases may become acute at any time, especially if worked on hard roads.

Treatment.—Give purgative as soon as possible—Arecolin Hydrobromide, 1½ grains, subcutaneously, or Linseed Oil, 1 quart. Remove shoes. Put in paddock with soft ground or tie in stream or puddle. Keep bowels well open with Epsom Salts in feed of bran mashes with little chaff. Exercise as soon as pain disappears, but not before. In addition give enemas of cold soapy water. Keep the animal down by hobbling the legs whilst on the ground. Feed on green stuff and allow plenty of water. Three or four ounces of Sodium Bicarbonate should be given in bran mashes if green feed is not available, and a little in the drinking water. Abstraction of 1 gallon of blood from the jugular vein will assist acute attacks. If cold water, ice, sea or stream is available the horse should be allowed to stand in it. Shoeing adjustments should be made to throw the weight on to the frog. After recovery blister the coronet.

CHRONIC LAMINITIS.

This is incurable, but horses so affected may remain in work on soft ground if the weight of the foot is kept on the frog and the wall kept rasped down. The sole must not be allowed to touch the ground, and it is advisable to put a leather cover between the wall and the shoe. After work the horse should be allowed to stand in wet sand, or on straw or soft ground.

STRANGLES.

This is an infectious disease due to bacteria, which usually affects young horses when brought into town and allowed to drink out of public horse troughs. It causes catarrah, and when the lymphatic glands under the jaw are infected they swell and finally form abscesses and swelling of the throat under the throat strap.

Symptoms.—The horse becomes dull, loses his appetite and becomes feverish, tempertaure rising to 103deg. F. or higher. Discharge of pus from the nostrils, the mucous membrane being a dark red colour. Sometimes the glands escape infection but usually after a few days they commence to swell and in about 10 days require lancing with a sharp knife. Whilst maturing the swellings should be rubbed with embrocation daily and not opened until almost bursting. After abscesses are opened the animal usually recovers. Complications may occur due to extension of the catarrh towards the lungs and stomach, and the germ may enter the general circulation setting up abscesses in the kidneys, liver, lungs, and joints. When the temperature rises to 104deg.-105deg. F., it is usually a sign of complications being present, and usually if death occurs it is due to septicaemia. Purpura haemorrhagica sometimes follows attacks of strangles, in which case the head and legs will gradually become oedematous and swollen and the skin exude serum in patches. The swelling becomes well marked, in some cases interfering with breathing, and most of these cases end fatally after a long illness.

Treatment.—Isolate affected animals. Steam head with gum leaves and hot water. Make liniment from—

Turpentine Oil, 1 ounce.
Strong Liquid Ammonia, 1 ounce.
Olive Oil, 4 ounces.
Rain water or distilled water, 8 ounces.

Rub swellings around throat daily or apply blister of biniodide of mercury—1 in 4. When abscesses mature open and obtain good drainage. Feed green stuff or bran mashes and keep stable clean. Valuable animals should be treated with antistreptococal serum. If the breathing is difficult a tracheotomy tube should be inserted in the windpipe. Avoid drenches—give medicine in form of electuary (mixed with treacle) and smeared on the tongue.

Extract of Belladonna, 1 ounce.
Potassium Chlorate, 4 ounces.
Ginger, 4 ounces.
Treacle, sufficient quantity.

LOCKJAW OR TETANUS.

This is a nervous disease manifested by continuous contraction of the voluntary muscles, due to the absorption of toxins from the tetanus bacillus, which usually enters the body by means of a wound coming into contact with infected ground. It may also follow operations. The germs of tetanus are found all over the world—especially in old pastures. The period which elapses between the introduction of the germ and the appearance of first symptoms is very variable and extends from two to 14 days, and is usually not less than a week.

Symptoms.—These usually last from three days to six weeks, and if horses live after nine days they sometimes recover. The first muscles affected are usually those of the face, which give the horse a drawn expression. The other muscles soon follow, and the mouth becomes fixedly closed, the nose poked out, the neck curved. The tail becomes raised and quivers. The limbs appear to be propping him up, and great stiffness is shown on movement. The diagnostic symptom is the haw of the eye, which will protrude when the horse is struck lightly under the jaw. Any excitement will aggravate the muscular twitching. After three weeks horses show signs of recovery, if they are going to recover. Convalescence is very long.

Treatment.—Keep animal in a quiet, dark loose box; leave undisturbed. Give liquid food. Calomel should be given on the tongue, as much as will cover a sixpence, to regulate bowels. Add tincture aconite, 1 teaspoonful, to drinking water daily. Anti-tetanic serum should be used before operations on valuable animals.

The original wound should be searched for, *i.e.*, a pricked foot, and if found should be cauterised thoroughly with a hot iron or caustic, *i.e.*, 40 grains of Chloride of Zinc to an ounce of water, or Tinct. Iodine. Liquid food should be given such as milk, beaten up eggs and gruel, which the animal will be able to suck up although unable to chew. Chloral hydrate, 2 ounces daily, may be added to the gruel to allay the nervous symptoms.

WOUNDS.

Wounds are divided into three classes:—

1. Incised, or clean cut.
2. Punctured.
3. Bruised.

The second class of wounds are the most dangerous as they are more likely to be followed by lockjaw, and there is greater difficulty in securing drainage, and further they are more liable to implicate bones and other deep structures. In all cases the following steps are necessary to ensure healing:—

(a.) Stop the bleeding by applying pressure.
(b.) Remove all dirt, clots of blood, and any foreign body, *i.e.*, stakes.
(c.) Destroy germs with antiseptic dressings.
(d.) Bring the edges of the wound together, if possible, with sutures.
(e.) Rest the part.
(f.) Dress the wound.
(g.) Secure drainage to the exterior of all discharges.

ABSCESSES.

An abscess is a collection of pus enclosed in any part of the body. It is usually due to the introduction of pus producing germs which are caught in various parts of the circulation when it is too small for them to pass through, *i.e.*, joints, capillaries, lymph glands, etc.

Symptoms in the case of abscesses are tenderness, heat, swelling, throbbing and pointing; when pressure is applied to a mature abscess with the finger tips the contents will fluctuate.

Treatment.—Before mature foment with hot water, and use embrocation daily until mature. Open when mature and secure good drainage.

SPRAINED TENDONS.

A sprain is an injury inflicted by excessive force with the result that the fibres are overstretched, broken, or torn away from the bones.

Treatment.—Use cooling lotions and rest if inflamed. Acetate of Lead, 1 ounce; Sulphate of Zinc, 1 ounce; cold water, 1 quart. Apply a flannel bandage or puttee soaked in this lotion. Renew twice daily. Blister after the inflammation has disappeared with Biniodide of Mercury and lard, and turn animal out for rest.

WORMS.

Animals are affected with two kinds of worms, *i.e.*,

Tape Worms, and
Round Worms.

The tape worms are not responsible for such heavy losses as the other kind, which includes several dangerous varieties.

Animals may be infected by grazing on moist, badly drained land in winter time, when they will pick up the worm eggs attached to the grass, and after hatching out these parasites become mature and reproduce their species, the eggs being passed out with the excreta to re-infest the pastures.

The most harmful worms found affecting horses are Roundworms, especially the Strongyles, which are about an inch and a half in length. These cause losses in young or debilitated horses when the animals are allowed to graze on infected pastures. The horse's stomach is sometimes infected with tumours due to the presence of habronema. In these cases digestion is interfered with, and horses so infected become emaciated.

Horse bots in the stomach are not usually responsible for any sickness or death, this being due to other causes.

Sheep and cattle are chiefly infected with Strongyles in the stomach. These cause parasitic gastritis and emaciation. Bottle-jaw in sheep is due to the presence of these parasites.

Pigs which fail to thrive are sometimes found to be infected with Ascarides or the Oesophagostomum dentatum in the intestines or the Stephanurus dentatum in the fat around the kidneys.

Dogs are chiefly infested by tapeworms, and should be kept off pastures when not working and treated with worm medicine. They should be treated for worms every three months.

Lung Worms.—These attack all the domestic animals, especially sheep. They may be found by slitting the windpipe down to the smaller bronchi, where they appear like tangled masses of white thread.

Symptoms.—Horses with worms fall away in condition, the appetite becomes morbid, and the coat becomes rough, and occasionally attacks of colic will occur. Worms are often passed in the fæces, and the animal becomes "pot-bellied" due to the accumulation of dropsical fluid.

Cattle when affected with parasitic gastritis fall away in condition and become emaciated and suffer from diarrhoea, although on good feed. They also develop dropsical swellings on the lower portions of the body, *i.e.*, brisket, belly.

Sheep when affected with parasitic gastritis fall away in condition and develop "bottle-jaw," which is an accumulation of dropsical liquid in the intermaxillary space. They also become "pot-bellied." Very often there is a high mortality from this disease.

Sheep with Lung Worms show signs of persistent coughing, with the head held in an extended position. Coughing is most marked on cold mornings.

Treatment, and Precautionary Measures.—Overstocking should be avoided, the land should be drained, and windmills and troughs erected. Never allow young animals to follow old ones in the paddocks. Put young animals on to fresh paddocks.

Horses.—Give rock salt in mangers. Starve for 24 hours, and afterwards give the following:—

Linseed Oil, 1½ pints,
with Oil of Turpentine, 3 ounces, or
with Oil of Chenopodium, ½ ounce; or Thymol, 15 grains night and morning.

Supply the following powder in the feed:—

Antimony Tartrate, 1 ounce.
Sulphate of Iron, 1 ounce.
Powdered Gentian, 4 ounces.

Divide into eight powders and give one in the feed every morning for eight days. Repeat linseed oil, 1½ pints, after seven days.

Cattle and Sheep.—Starve for 24 hours, and then give Copper Sulphate solution prepared in the following way:—Dissolve ¼lb. of clear blue crystals of Copper Sulphate in a pint of boiling water. When making the solution use a porecelain or enamelware dish, as the Bluestone will corrode most metals. Add to this solution enough cold water to make it up to 3 gallons, using non-metallic receptacles. This will make a 1 per cent. solution. The dose has to be graded according to the age of the animal:—

Lambs 3 months-12 months, ½ to 1½ ounces of 1 per cent. solution.
Sheep over 12 months, 2 to 3 ounces of 1 per cent. solution.
Calves, 3 to 4 ounces of 1 per cent. solution.
Yearling cattle, 6 ounces of 1 per cent solution.

Dose a few first to ensure safety of the solution used.

No water should be given on the day they are dosed. Supply licks made up from:—

Slack Lime, 6 lbs.
Sulphate of Iron, 6 lbs.
Crushed Salt, 1 cwt.
(This should be protected from rain.)

Pigs.—Give in the feed Calomel up to 1 drachm, powdered Jalap 1 to 3 drachms.

Dogs.—These are subject to infestation with several varieties of tape worms. The intermediate stage of these worms is found in cattle and sheep, consequently all dogs on stations should be kept away from slaughter-houses and free from worms by dosing at intervals with freshly ground Arecanut, 2 grains for every 1lb. body weight. Thus if a dog weighs 60lbs., he would require ¼ ounce of Arecanut, and this should be given in glycerine or castor oil, 1 ounce Keep dogs tied up when not at work, and destroy all fæces.

Valuable sheep or cattle with Lung Worms may be treated by injecting medicines into the windpipe with a hypodermic syringe. Further particulars of this method may be obtained on application to this Department.

IMPACTION OF OMASUM—THIRD STOMACH.

Dry Bible, as it is commonly called, consists in an accumulation and drying of masses of fæces in the stomach, due to continuous feeding with indigestible dry food. This is a very popular disease, some stockmen being inclined to treat every case of constipation as impaction of the omasum, basing their conclusions on the hard dry state of the contents of the bible after death. Seeing that this is its natural state, the cause of death is more likely to be due to inflammation of the fourth stomach, *i.e.*, gastritis. In gastritis a disturbed condition of the nervous system is a distinguishing symptom, the brain may be chiefly affected, as shown by excitement followed by coma, or the spinal cord, in which case there may be partial paralysis.

in the hind legs. In addition there is diarrhœa, followed by obstinate constipation, due to stoppage of the bowel movement (peristalais). There is an absence of sounds on listening for bowel movement at the flank. The fæces are covered with mucus and voided in small amounts frequently.

Symptoms.—An affected animal first loiters about, feeding occasionally, and when lying down there is an intermittent tremor at the elbow and flank, and any excitement—such as being driven—may cause temporary loss of sight. Next purging occurs, fæces being black and watery, entire loss of appetite, cessation of cud chewing, failure of milk, grinding of teeth, accelerated pulse, cold extremities, blindness, but acute hearing. Temperature remains normal. In three days crisis is reached, when animal may become intensely excited, bellow, press the head against walls and fences, and have violent tremors.

Treatment.—Treat early by giving laxative food and drenching with raw linseed oil, 1 quart. Repeat oil if necessary. Put on to stimulant powder afterwards, such as:—

Carbonate of Ammonia, 6 ounces.
Nux Vomica, 1 ounce.
Powdered Ginger, 4 ounces.

Give two tablespoonfuls three times a day in a quart of thick treacle water.

RETENTION OF PLACENTA.

This is due to contagious abortion in some cases in cows and in other cases it is difficult to account for the animal not cleansing. There is no danger in the cow if the placenta is not removed before three days, but if removed before then the uterus will be wounded and may become infected with germs, setting up inflammation of the womb. After three days the placenta should be very carefully removed by twisting it into the form of a rope and gently inserting a perfectly clean disinfected hand into the womb and removing its attachments to the uterus. After removal the uterus should be irrigated with weak, warm antiseptic, *e.g.*, Condy's Crystals (potassium permanganate), solution of Lysol (1 teaspoonful to a kerosene tin of water), using a hose pipe and funnel, and draining out all the liquid injected. In mares the placenta should be removed six hours after foaling. There is a great risk of Metritis if it is left any longer.

MILK FEVER IN CATTLE.

This is a condition which occurs at the termination of parturition and which is manifested by sudden loss of consciousness and general paralysis. It is met with most frequently on farms with succulent food and first class milking cows. It is more common in heavy milkers, after third, fourth, or fifth calving—especially common after easy calving. It usually occurs two or three days after calving, but may occur two days before calving. Due to lowering of blood sugar content.

Symptoms.—Two days after calving the appetite declines without visible cause and the animal becomes restless, looking about nervously, bellows, and continually moves hind feet. Weakness becomes noticeable, the animal staggers and sways, and finally being unable to stand any longer falls down.

After feeble attempts to rise semi-coma gradually sets in, and the animal lies propped with feet under the belly and the head turned round and resting on the shoulder; if straightened it immediately returns to its original position. The animal may assume other positions, and is sometimes found stretched out on her side, as if dead. Evacuations cease, consequently fæces and urine accumulate. Temperature is usually below normal, and ears, horns, and feet are cold.

Treatment.—Inflate udder with filtered air. After treatment cow usually recovers in a few hours; if not, treatment should be repeated. It is dangerous to drench cows with milk fever as they cannot swallow, and the drench will go down the windpipe to the lungs and cause pneumonia.

PROLAPSES OF WOMB.

This is the expulsion through the vagina of the uterus or womb. It may be due to the slope of the ground causing extra pressure on the external orifice or to weakness of the part. Diagnosis can be made by the fleshy structure differing from the cleansing or the bladder, which are sometimes found in this position. Often the placenta or cleansing is found to be still adherent.

Treatment.—Remove cleansings. Wash gently with weak solution of permanganate of potash. Sprinkle with granulated sugar and allow time to shrink, then replace with flat hands on surface of womb. Before replacement stand the animal with head downhill and give chloral hydrate, 1 ounce in a quart of water.

METRITIS OR INFLAMMATION OF THE WOMB.

A very fatal form of inflammation occurring after parturition in the cow, mare, ewe, bitch, or sow. It is due to blood poisonning by germ infection of wounds in the womb caused by difficult parturition or retained cleansings. The inflammation is characterised by the rapid formation of an abundant quantity of dark chocolate-coloured fluid which is discharged later from the genital passage—which causes much straining.

Symptoms.—Restlessness, paddling of hind feet, loss of appetite, suppression of milk. Vulvæ small, contracted mucous membrane dark purple with petechial spots. Violent straining with discharge of offensive liquid and fœted diarrhœa, abdominal pain, shown by the animal kicking the belly. These symptoms are sometimes complicated with inflammation of the feet (founder). The breathing is difficult and at last complete unconsciousness sets in, and the animal dies in from 12 hours to two days.

Treatment.—Give aperients, stimulants, *i.e.,* Tincture of Opium, 1 ounce, Aromatic Spirits of Ammonia, 1 ounce, or Whisky, 2 ounces, in a pint of cold water. Irrigate uterus with weak permanganate of potash (Condy's) solution. Apply hot fomentations to loins. Remove placenta if still in womb.

MAMMITIS—INFLAMMATION OF THE UDDER.

The exciting causes may be general or local. To the former belong irregularities in diet, and the local causes, bruising or other external injuries. Cows are subject to it when in fat condition at the time of calving or if the

animal be turned into a rich paddock when the organ is in high activity. The last cause is a very common one. Inflammation of the udder is frequently caused by the practice of overstocking. This consists in the preparation of cows for show or market by allowing them to go unmilked until the quarter becomes greatly distended.

Acute mammitis seldom attacks the whole udder, but is confined to one or two quarters. Symptoms are expressed by a swelling, heat, pain, and redness of the part, with an alteration in the physical properties of the milk which is curdled, whey-like, and mixed with blood. There is a general body disturbance, such as shivers succeeded by increased heat of the skin. The bowels are also disordered.

Termination of the Disease.

1. Recovery of the part to its normal condition, which occurs only when the part is slightly inflamed.

2. A very common result consists in the part losing its functions and the formation of hard fibrous mass in place of the normal tissue.

3. Chronic suppuration or pus formation, the gland becoming hard in parts afterwards breaks and discharges pus, or the pus may be discharged through the teat. This is a very common termination in mares, and may result in the animal wasting away in condition, finally dying of septicæmia.

4. Gangrene or death of the part. Through the pressure of the thighs on the swollen udder or through the cow bruising the part during the time it is affected with milk fever paralysis.

Treatment.—If caused from diet, give purgative medicine, and in cattle the following is a useful drench before or after calving:—

Magnesium Sulphate (Epsom Salts), 16 ounces.
Sublimed Sulphur, ½ ounce.
Powdered Ginger, 1 ounce.
Tartrate of Antimony, ½ ounce.
Treacle water, 1 quart.

If there is fever give, in a pint of warm water, the following:—

Nitrate of Potash, 1 ounce.
Hyposulphate of Soda, 1 ounce,

If the animal is inclined to eat avoid food with much milk-producing constituents and keep on bran mashes. The local treatment is of great importance. First, milk should be frequently drawn—if it cannot be done by the hand a teat syphon should be used. This with fomentation with warm water is sufficient for the milder cases, but when the udder is swollen and discharges very thick pus the quarter should be syringed out with weak solution of flavine, 1 in 1,000, or chinosol, using half a pint of solution to each quarter. Allow the solution to remain in the quarter if flavine is used. Repeat three or four times daily. To relieve a very swollen udder a broad bandage should be used,

covering the part, and supported round the spine. The udder may be frequently rubbed with the following:—

Belladonna Extract, ½ ounce.
Strong Liquid Ammonia, 2 drachms.
Soft Soap, 2 ounces.
Oil of Turpentine, 1 ounce.
Olive Oil, up to 16 ounces.

This not only relieves the pain but relaxes the teats, which allows of the escape of milk. If suppuration takes place the abscesses are to be opened, pus allowed to escape, and the wounds dressed with weak solutions of potassium permanganate (Condy's). Flavine, 1 in 1,000, is more effective if available.

CHOKING.

In the horse it is generally caused by lodgment of a quantity of food, especially in a dry state, such as chaff swallowed rapidly by a greedy feeder, also by a piece of potato or a ball of large size. Eggs forced into the pharynx or gullet often prove a cause of obstruction. Animals with a voracious appetite are apt to bolt their food and gulp it down so rapidly that the successive portions, instead of passing into the stomach, accumulate in the gullet and block up its canal. Only a small quantity of food is sufficient to cause uneasiness. All at once the animal leaves off feeding, makes every effort to dislodge the food, and should it not succeed the throat and neck become spasmodically drawn up, and it will give now and then a loud shriek. When attempting to swallow liquids they are returned through the nostrils together with the saliva collected in the mouth. When the obstruction is in the neck a swelling is plainly seen in the course of the gullet on the left side.

General symptoms are:—Great anxiety of countenance; sunken head; tremors; partial sweats over the body and great exhaustion shortly after the occurrence of the obstruction. In the cow the obstruction is generally a piece of turnip, potato, old pieces of leather and bones. Symptoms in the cow are tympanitis (blown), involuntary movement of the jaws, excessive flow of saliva from the mouth; violent cough causing expulsion of fæces or urine.

Treatment.—The tongue should be well drawn out of the mouth and the hand introduced and any pieces of wire in the throat removed. If there is no obstruction in the throat it may be lower down and manipulated on the outside of the neck and pushed upward or downward. Should this method, however, fail it may be removed by causing the animal to swallow liquids, gruels, or an emulsion made by mixing a quantity of oil and water. When these methods fail the probang or whip-handle must be used. This is easier in the cow than in the horse. Care is necessary in the horse to avoid injuring the turbinate bone. If unsuccessful the object may be removed by making an incision through the neck into the gullet just large enough to remove the object; afterwards the wound should be sutured with strong silk stitches with antiseptic precautions.

ZAMIA PALM POISONING—("RICKETS," "WOBBLES").

This is common in dairy cattle which have been running out in the bush in the South-West portion of the State. It is due to the cattle eating the palm nut, which contains a poison that acts on the nervous system, producing permanent changes in the spinal cord—hence the partial loss of power in the hind legs. Rickets or Rachitis is a different disease, and only attacks young animals.

Treatment.—Preventative treatment is recommended which consists in destroying the palms with kerosene before allowing the cattle on the palm country. Liberal hand feeding is also recommended. The following medicinal treatment is recommended, and should be administered as soon as possible to affected animals:—

Epsom salts, 1½ lbs.
Common salt, 6 ounces.
Ginger, 1 ounce.
Treacle, 6 ounces.

Give as a drench with a quart of warm water. Hold the animal's head and neck straight when drenching. This drench is only of use if given soon after the animal has eaten the poison.

SCOURS IN CALVES.

This is usually due to errors in feeding, but may also be due to germ infection of feeding and drinking vessels, which should be kept scrupulously clean. All milk should be warmed before feeding to calves: if separated milk is given fat should be added to it in the form of linseed meal and a little sugar. Medicinally give—

Powdered ginger, ½ ounce.
Sodium bicarbonate, 3 ounces.
Lime water, 16 ounces.
Dose—Two tablespoonfuls three times a day in milk.

If not effective, give the following powder:—

Powdered chalk, 2 ounces.
Sodium bicarbonate, 1 ounce.
Powdered ginger, ½ ounce.
Powdered opium, 1 ounce.
Dose—One tablespoonful twice a day.

FATTY INFILTRATION OF LIVER IN EWES.

This is a very fatal disease of the liver in ewes, usually occurring from a fortnight to within a few days before lambing. The affected ewes show a disinclination to move about, and may have a yellow (jaundiced) tint of the skin and the eyelids, due to the liver being unable to get rid of its bile, which is re-absorbed into the general circulation. After a few days the ewes go down and refuse, or appear unable, to rise, and gradually waste away until they die. *Post mortem* examination reveals a fatty, yellow liver.

Treatment.—Avoid overfeeding before lambing. Give laxatives and exercise.

BOX POISONING IN SHEEP.

This is prevalent in the Great Southern districts of the State. The box plant is very difficult to eradicate permanently, and the seedlings appear after rains in paddocks which have been burnt, even twenty years after the poison has been erroneously thought to be eradicated. The seeds of this plant are also poisonous. Sheep eating the seedlings show brain symptoms in a few hours. They run around in circles, soon develop convulsions, and die. On *post mortem* examination the heart is found to be distended with blood and the lungs, liver, and kidneys are congested.

Treatment.—Give potassium permanganate or antidote tablets when possible. When administering potassium permanganate give as much as will lie on a sixpenny piece. Do not drove affected sheep.

FOOT ROT IN SHEEP.

There are two kinds of Fot Rot, viz.:—(1) Traumatic; (2) Infectious. Traumatic foot rot is due to injuries to the feet by various external objects, *i.e.,* Dougle-gees, etc. Infectious foot rot is an infection of the foot of the sheep with a specific germ.

The second form is the more serious, although both prevent sheep travelling to obtain food, and thus cause loss of condition. The second form is very rare, but occurs on moist rich ground in certain localities which appear to harbour the germ.

Symptoms of Traumatic Foot Rot.—When first attacked the sheep show slight lameness, and on examination of the feet there is a swelling around the coronet where the hair joins the hoof, the hoofs are inflamed and hot, and later the pain becomes intense and the sheep grazes on its knees. In advanced cases the hoof may slough off.

Treatment.—Keep the sheep off damp flats in winter. Run affected sheep through a gateway with lime on the ground. All foreign bodies should be removed from the hoofs, and where necessary surgical treatment applied.

A trough 12 feet long, one foot wide, and six inches deep should be placed in the drafting race, and the following mixture made and poured into the trough to a depth of three inches:—

Alum, 4 ounces.
Sulphate of copper, 4 ounces.
Warm water, 5 quarts.

The affected sheep should be walked through this night and morning. Afterwards dress with sulphate of copper and Stockholm tar—equal parts. Another mixture is made from perchloride of mercury and Stockholm tar, one in four, blended with castor oil. Still another can be made from arsenic 2 lbs. and potash 2 lbs., boiled in one gallon of water over a slow fire for half an hour. Keep stirring, and when the mixture is likely to boil over add a little cold water. After the mixture has boiled for the stated time, add 8 gallons of cold water.

Sheep should never be bought from a farm where Foot Rot is known to exist.

RHEUMATISM.

This is an inflammation of the fibrous structures of the joints, tendons, ligaments accompanied by fever, stiffness and lameness. There are two forms:—

(1) Acute Rheumatism or Rheumatic Fever.
(2) Chronic Rheumatism.

Acute rheumatism sometimes leads to chronic rheumatism if not treated, but is often followed by complete recovery if treated early. Chronic rheumatism is liable to become acute at intervals. It is more persistent, and leads to alterations of structure in the white fibrous structures and bones, especially the joints. Vegetations sometimes occur in the valves of the heart and permanent changes occur in the heart muscle.

Symptoms.—Acute Rheumatism: Sudden lameness with swelling of joints or tendons. Lameness may disappear from one part and show up in another. The pulse is hard and unyielding, and mouth hot and dry. Constipation is usually present. Swellings gradually harden, but seldom suppurate. Temperature is usually high—105 deg. F. to 106 deg. F.

Chronic rheumatism is similar to the above, except that the fever may be absent.

Articular (joint) rheumatism is common in milking cows.

Muscular rheumatism affects horses and dogs chiefly.

Treatment.—Keep animals warm.

Acute Rheumatism (Horse).—Give an Aloetic ball 6 to 8 drachms, according to size of the animal. One tablespoonful of nitrate of potash (saltpetre) should be given in the drinking water daily. An ounce capsule of salicylate of soda should be given night and morning until temperature returns to normal.

Local treatment.—If pain is very great foment and apply liniment of belladonna, made up from—

Solution belladonna, 6 ounces.
Spirits of camphor, 10 ounces.
Acetic acid, ½ ounce.
Soft soap solution to 26 ounces.

Chronic Rheumatism.—Blister near the affected parts and repeat if necessary. Blisters are very beneficial in all cases. Scalding water or cautery may be used.

Pigs.—These animals are very susceptible to rheumatism, and should be provided with warm and dry beds. If they become affected they should be given a purgative: Calomel, 1 drachm, and Salicylate of Soda, 1 teaspoonful, in the feed.

CRINKLE OF JAPANESE PLUMS.

W. M. Carne, F.L.S.,
Economic Botanist and Plant Pathologist.

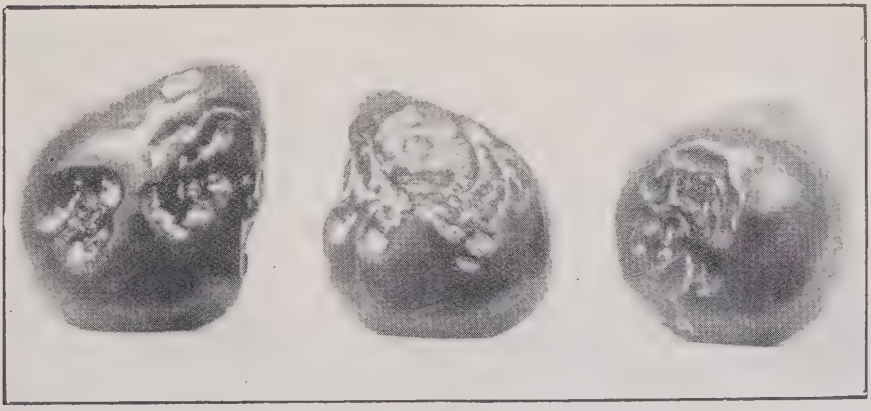
Several occurrences of this trouble were noted during January of this year.

It may be recognised by the presence on the sides of the fruit of dark, hard, depressed irregular areas which may cover more than one half of a fruit. The surfaces of these areas are much pitted or wrinkled.

Usually only odd fruits are affected, but in bad cases, particularly with Kelseys, much fruit may be rendered unfit for market. In one instance this season a heavy crop of Kelseys on fourteen trees at Wooroloo was quite unsaleable.

The disease is associated with high temperatures and drying winds, especially where the soil tends to be too much on the dry side. In consequence, the trouble is most marked in hot, dry summers. It is probably due to the leaves robbing the fruit of water during periods of high transpiration following rapid growth.

No preventive treatment can be recommended. Where the trouble is common on Kelseys it would be advisable to rework the trees to other varieties.



Kelsey plum showing crinkle.

APPLE OF SODOM.

(*Solanum sodomaeum*, Linn.)

W. M. CARNE, F.L.S., AND G. A. GARDNER.

This prickly shrub is an introduced plant native to the warmer parts of the Old World, probably originating in the Mediterranean region, but it is now naturalised in all of the Australian States. It has been naturalised in Western Australia for a very long period.

Apple of Sodom is a noxious weed under the Act of 1924, but is only of any consequence in the western coastal districts, particularly in the Tuart sands of the limestone areas. It is known to occur between Geraldton and Cape Leeuwin, extending inland to the Darling Range.

As a noxious weed it is an undesirable plant, because it is poisonous, is difficult to eradicate on account of its spreading prickly habit, and in addition it harbours the following insects:—Fruit Fly, Black Scale, Red Scale, Greedy Scale, Potato Moth, and Capsicum Moth, hence its presence near orchards is a source of danger.

The Latin name of Solanum is of doubtful origin, but was used by the Romans for the Nightshade. The specific name of Sodomaeum alludes to Sodom, but it is of interest to know that the plant does not occur in Palestine, and is not the Apple of Sodom or Dead Sea Apple of Biblical literature.

The Apple of Sodom is poisonous, the unripe fruits probably being the most poisonous parts, but it is unlikely that stock will eat the plant owing to its prickly nature.

Description of Plant.—A low spreading shrub of usually two or three feet in height with widely spreading intricate branches, the branches armed with stout thorns; leaves shortly stalked, wavy or undulate, divided nearly to the midrib into blunt segments, dark green above, rather paler underneath, three to six inches in length, the midrib and principal nerves armed with rather stout white spines most copious on the lower side of the midrib. Flowers violet, in short racemes with few flowers. Calyx divided to about the middle and together with the stalk (pedicel) very spinous and hairy. Corolla delicate, divided to about the middle into five broad lobes, folded when in bud. Stamens five alternating with the lobes of the corolla, with large oblong anthers closely surrounding the style.

Fruit large, depressed globular, before ripe variegated green and white, when ripe, yellow. Seeds numerous in pulp, flattened, the pulp acrid and greenish.

Control.—The plant is perennial, and should be either burned or cut down. Unfortunately it will continue to send up seedlings, and these should be either ploughed or hoed out while young. It is important that the plants when in fruit should be burnt after being cut down, or they may ripen seeds.



Apple of Sodom (*Solanum sodomæum*, Linn.).

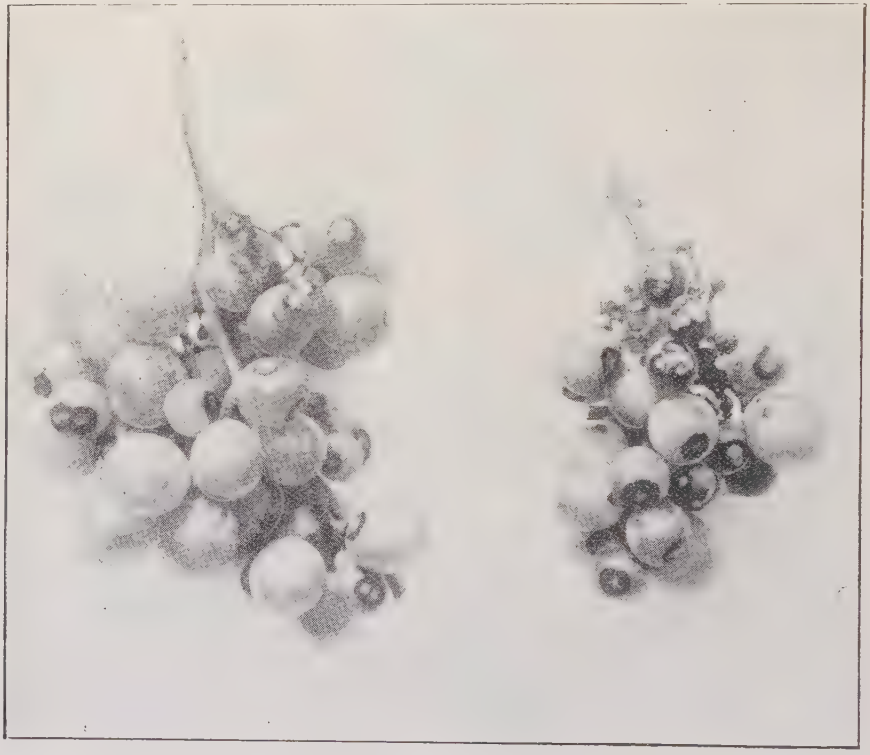
BLACK SPOT OR ANTHRACNOSE OF THE GRAPE VINE.

(*Gloeosporium ampelophagum.*)

W. M. CARNE, F.L.S.,
Botanist and Plant Pathologist.

This article deals with one of the two important fungoid diseases of grapes in this State; the other is Oidium or Powdery Mildew (*Uncinula necator*).

Black Spot is liable to occur wherever grapes are grown. At present, however, it is practically confined to the vineyards of the coastal plain and foothills. The newer grape-growing areas away from the coast are nearly free.



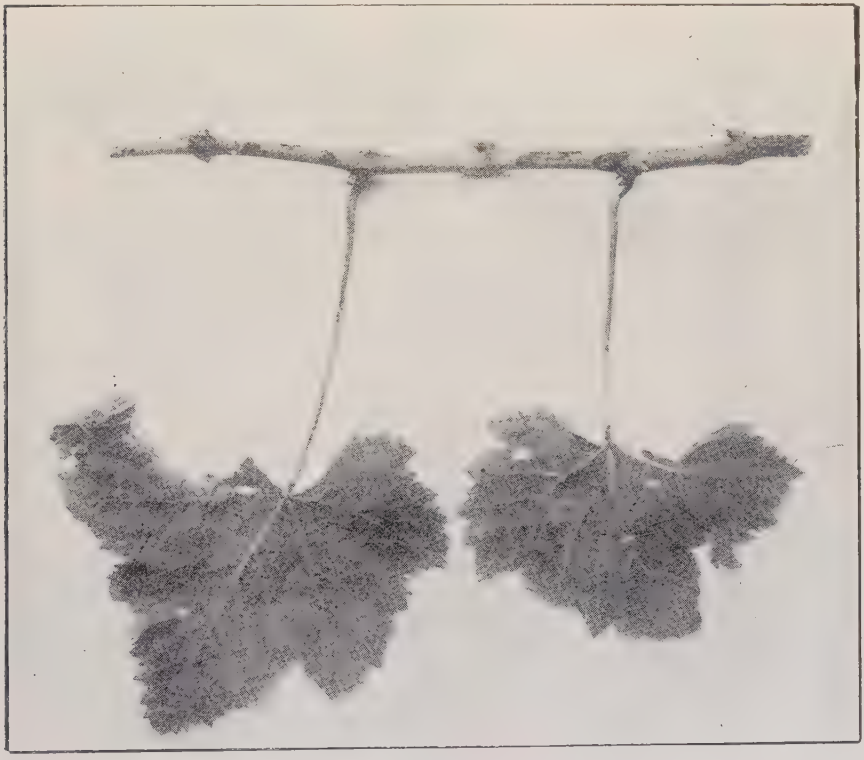
1. Black Spot on Fruit.

Varieties differ considerably in their susceptibility. Sultanas, Malagas, Ohanez (Almeria), Muscats, and Grenache are very liable. Gros Coleman appears to be practically immune.

Symptoms.—All green parts of the vine are subject to attack. Dark spots appear on the berry which grow larger and darker. The spots are

rounded, the centre becomes sunken and grey in colour, and the margins become reddish or purple. If attacked when very small the berries may become dry and fall; if larger, they become deformed and frequently crack. The flowering stalks are frequently attacked and often become girdled by cankerous spots, causing the flowers or fruits to dry up or fall. On canes the spots become elongated and form dark-coloured pits or cankers with raised edges exposing the wood in the centre. These cankers run lengthwise along the canes and persist for years. On the leaves the spots are pale grey with dark red or purple borders.

Season.—Black Spot is principally a spring disease in this State, developing rapidly so long as the weather is moist and humid. With the usual



2. Black Spot on Canes and Leaves.

dry summer weather little further infection takes place, but should the wet season continue late, or unseasonable summer rains occur, the disease may continue to spread and make the grower's ordinary methods of control insufficient. Such seasons lead some growers to blame the control measures, not realising that spraying must be adapted to the season and that no hard-and-fast rules as to the number of sprayings required can be laid down.

Life History of the Fungus.—The full history of the fungus is not definitely known. A perfect spore stage has not been found. Two imperfect spore forms are known. The fungus has also been called *Manginia ampelina.*

Infection of the young green tissues commences shortly after the buds burst in the spring. This results from microscopic spores which develop in the cankers and pits formed during the previous season. The spores are exuded from these older lesions in gummy masses. When rain or heavy dew



3. Black Spot, showing effects of attack on young fruit.

dissolves the gum the spores are freed and splashed or blown on to tender green growth. There they produce minute thread-like growths which penetrate the tissues and set up infection. It can thus be readily understood why the disease spreads so rapidly in wet or humid weather. The fungal threads

grow within the surface tissues of the plant, causing their disorganisation at the points attacked and resulting in the formation of spots and scars. From the fungal growth which is massed at these points spores are formed which, under favourable conditions, are spread to other parts of the plant and cause further infection. As the vines go dormant and the leaves fall the fungus within the scars on the canes does not die but goes also into a dormant condition. In the spring it comes into growth and throws off spores which start the spread of infection again. It is obvious that any treatment which prevents the dormant fungus in the canes from producing spores is likely to be more effective than one which attempts to prevent the spores, once formed, from infecting the tender parts of the plant. The dormant treatments outlined in this article aim to destroy the dormant fungal growth by the action of solutions which will penetrate with a powerful corrosive action sufficiently deep into the tissues of the canes without penetrating far enough to cause damage to the vines. It is also obvious that such a treatment could not be applied to immature canes or tender tissues. While spores may be carried by the wind from infected vines to nearby vines and so spread the disease, *the principal cause of the infection of new areas is the use of cuttings bearing the resting stage of the fungus in cankers or spots.*

Control.—The methods of control adopted by growers are designed with two objects in view—

A. *Dormant Treatment* to destroy the fungus in its resting stage, and so prevent the production of spores in the spring.

B. *Spring and Summer Treatment* to protect the flowers, fruit, and young growth from infection by spores in the spring and summer.

Dormant Treatment—

1. Burn all prunings.
2. Where possible, loose old bark on the vines should be removed and burnt. This is an aid to 3.
3. Treatment of the pruned vines as late as possible, before the buds burst, with one of the following treatments. A certain amount of leaf burning of the young shoots may result, but this is of no consequence. Treated vines are also a week or two later in bursting their buds.

There are three principal dormant treatments—

(a) *Strong Bordeaux Mixture Spray.*—This is the method usually used by growers on the Swan. The formula used is—

Bluestone, 20 lbs.
Fresh Lime, 20 lbs.
Water, 40 gallons.

This mixture is difficult to handle with the spray pump, and some growers have dropped out the lime and use 10 to 20 lbs. of bluestone to 40 gallons of water. This appears to be equally effective.

(b) *Acid Spray.*—This method is used to some extent in New South Wales. Its action is drastic on ordinary spray pumps, so that growers use small cheap pumps, or special pumps designed for

the purpose. These are either lead-lined knapsack pumps, or large cask sprayers with external pressure pumps. The formula is—

Strong Commercial Sulphuric Acid, 1 gallon.
Water, 10 gallons.

The acid must be slowely poured into the water while stirring, to prevent spurting. Use a wooden or earthenware vessel.

The acid-iron swab solution given in (c) is also used as a spray in Victoria.

(c) *Swabbing.*—This is used in the Eastern States and has also been used here, but has been largely dropped owing to the time taken, and expense. When properly done it is most effective.

The acid solution given in (b) is used for swabbing in New South Wales, but the general formulæ contain sulphate of iron.

Various formulæ have been recommended. Those used principally in Australia are given below:—

Formula recommended by :—	Victorian Department of Agriculture.	Merbein Viticultural Exp. Station, Vict.	New South Wales Department of Agriculture.
Strong commercial Sulphuric Acid	8lbs. (Approximately 3½ pints)	7lbs. (Approximately 3 pints)	5 pints
Sulphate of Iron	35lbs.	20lbs.	50lbs.
Water	10 gallons	10 gallons	10 gallons

(An ordinary wine bottle contains approximately 1½ pints or 3½lbs. of sulphuric acid.)

Dissolve the sulphate of iron in hot water or by suspending overnight in a piece of bagging in water. Add the acid slowly while stirring to prevent spurting. Use a wooden or earthenware vessel. Apply the solution to the vines by means of a small tar brush, a brush made of binder twine on a long handle, or a mop made of woollen rags.

Spring and Summer Treatment.—When the buds are bursting, spray with Bordeaux mixture (6.6.40) or Burgundy mixture (6.9.40). Where the disease was bad the previous season, some Swan growers preferred to use a 10.10.40 Bordeaux mixture. A second spraying, just before blossoming, with Bordeaux (6.6.40) or Burgundy mixture (6.9.40), followed by a third after the fruit has set, is usually sufficient. If the spring is dry the second and third sprayings may not be necessary, but if the season continues late, or if summer rains occur, further sprays may be advisable. Later sprayings should be weakened to 50 gallons instead of 40 gallons of water.

Once the fruit has set, special care should be taken to see that the bunches are well sprayed.

Careful watch should be kept, a spraying following when evidence of the disease spreading is noted. The climatic conditions favouring the disease are (1) humid weather, and (2) rain or heavy dew followed by sunshine.

FRUIT FLY DESTRUCTION BY SOIL INSECTICIDE.

The Entomologist of the Department of Agriculture, Mr. L. J. Newman, advises that the following experiment was undertaken to test the possibility of destroying fruit fly, during its life stage in the soil, by the use of a soil insecticide.

Working in conjunction with the proprietors of the Dumore Company, a trial was made with their spraying oil which has proved effective against other insects. The company did not claim that the preparation would accomplish the desired purpose, but it willingly supplied material for the trial.

The *modus operandi* was as follows:—

Two areas of soil 4ft. x 4ft. square were covered with fly-proof netting.

Into each cage was placed a number of maggot infested fruits.

One cage was sprayed with the oil twice at intervals of eight days.

The control cage was left untreated.

The material used was diluted at 1 pint to 6½ pints of water. The amount of diluted spray applied was 56½ fluid ounces (20 fluid ounces are equal to 1 pint), or at the rate of 960 gallons per acre. The cost of treatment worked out at 2d. per gallon or £8 per acre.



Covered cages used in the ground treatment experiments.

It was anticipated that the presence of the oil in the soil might have a destructive effect upon the maggots as they left the fruits and entered the ground, or that the pupa or emerging fly might be killed.

Daily observations of the test finally revealed the equal issuing of the flies in both treated and control cages, and it is, therefore, evident that the treatment is not effective; but had it proved efficacious the proposition would have been economically possible.

Mr. Newman goes on to say that he is not very sanguine that it will ever be possible to deal with this pest through soil insecticides, as the presence of the growing plant limits the strength at which the insecticide can be applied to the soil.

WINTER FRUIT-FLY.

L. J. NEWMAN, F.E.S.,
Economic Entomologist.

Following on a very serious fruit-fly summer, it behoves all growers of fruit to continue the campaign against this pest throughout the winter and spring. Should the winter prove favourable to the fly there will in all probability be a large carry-over of adult over-wintering females. As has been frequently pointed out, there is no hibernating period, our winter not being severe enough in the fly areas to induce this stage.

The pest depends largely on the successful wintering over of the adults, with occasional generations of eggs laid during bright sunny periods. These eggs are successfully deposited in thin-skinned or split oranges, mandarins, and later towards spring in the loquats. It is infinitely of more value to destroy the fruit-fly when at its lowest ebb than when in countless millions at the height of the fruit season. One carry-over fly trapped in winter or spring is worth a thousand caught in the summer. To this end it is advised that all growers, large or small, make a determined effort to destroy the winter-spring flies by trapping and baiting.

Generally speaking, the weather conditions at this time of the year are against regular foliage baiting. There are, however, many periods of fine weather which entice the flies forth, and it is during such periods that citrus and loquat trees should be foliage baited.

Trapping.—There is no month of the winter or spring when this method does not yield valuable results. It is a satisfactory method in that one has the pleasure of seeing the flies drowned in the lure. There are several effective lures, both home-made and proprietary, which may be used to good effect.

In cleaning out the traps, when renewing the lure, care has to be taken to see that all the flies captured are dead. The practice of simply swilling out the traps and throwing out the contents on the soil is fraught with danger. Many of the flies more recently caught will not be drowned, and when thrown out, revive. To obviate this danger it is advised that when renewing the lure and cleaning out the traps a kerosene tin or other receptacle be used. The vessel should contain a little water with a good film of kerosene oil; the contents of the traps to be tipped into the oil and water, and there allowed to remain until the flies are drowned or destroyed by the oil. In further testing the pollard lure, it has been proved that the increase from eight ounces to 16 ounces of powdered borax to four gallons of mixture extends its effectiveness as a lure from one week to two weeks.

The Formula is now recommended as follows:—Pollard 4 lbs., powdered borax 16 ounces, water 4 gallons. Mix ingredients thoroughly, and allow to stand for several hours.

Stir again thoroughly and allow all sediment to settle. The resultant liquid will be amber-coloured, and should be strained off and used in traps. By the use of the clear liquid lure, the clogging up of the traps is prevented.

Renew lure every 14 days.

To supplement the baiting and trapping orchard sanitation plays a big part. All infested fruits on the trees and ground should be religiously picked and gathered daily, and destroyed by boiling.

PASTURES.

HOW PHOSPHATIC MANURES IMPROVE COMPOSITION OF FODDERS.

G. K. Baron-Hay, B.Sc. (Agr.),
Dairy Adviser.

When demonstrations in the top-dressing of pastures with a phosphatic manure were inaugurated in this State in the Autumn of 1923, it was confidently believed that the results from such applications would be a great increase in the growth of herbage on the fertilised areas.

The results obtained since that date leave no doubt on this point, as is shown by the following summary of results of applications of 1cwt. and 2cwt. of superphosphate per acre, as compared with a no-manure plot, for the season 1925:—

PERCENTAGE YIELDS—TOP-DRESSING DEMONSTRATIONS.

District.	1cwt. Super. per acre.	No Manure.	2cwt. Super. per acre.	Rainfall Growing Period 1925.	Average Annua Rainfall.
Great Southern—					
Northam	231	100	189	891	16·96
Toodyay	236	100	291	1,524	21·19
Narrogin	350	100	525	1,111	20·02
Pingelly	700	100	800	999	17·23
Katanning	400	100	400	1,300	18·46
Kojonup	367	100	386	1,543	22·29
Mt. Barker	5·04 tons	Negligible	5·17 tons	1,962	29·41
Dwarda	270	100	280	1,572	24·78
South-Western—					
Harvey	563	100	853	3,113	39·79
Bunbury	211	100	288	2,814	36·50
Busselton	200	100	222	2,244	31·77
Balingup	325	100	450	2,371	39·28
Kulikup	600	100	600	1,618	26·03
Denmark	333	100	355	3,150	49·31
Midlands—					
Geraldton	130	100	176	1,579	18·66
Dongarra	7·2 cwt.	Negligible	16·2cwt.	1,958	18·49
Northampton	150	100	250	1,724	20·32
1925—15 plots	338	100	404	...	...
1924—21 plots	258	100	305	...	...
1923—11 plots	204	100	270	...	...
Average, 1923–25	271	100	328	...	...

Demonstration plots were also carried out at Wagin, Wickepin, Gnowangerup and Moora, but the results were not comparable, owing to the light rainfall at these centres during the growing period last year.

The monthly rainfall during the growing period for the districts where plots were situated during 1925 is given in the following table. It will be noticed that in every centre the rainfall during the growing period for 1925 was below normal:—

RAINFALL DURING THE GROWING PERIOD, 1925.

District.	April.	May.	June.	July.	August.	Sept.	October.	Total.	Average.
								inches.	inches.
Toodyay ...	...	292	360	403	58	280	121	1,514	18·22
Northam ...	...	171	335	244	26	236	50	1,262	14·16
Narrogin ...	...	241	220	229	68	171	182	1,111	16·12
Pingelly ...	...	160	221	281	57	165	77	961	13·94
Katanning ...	...	204	249	270	164	156	257	1,300	14·24
Kojonup ...	78	263	298	336	97	204	265	1,543	18·82
Mt. Barker ...	184	290	275	387	146	272	408	1,962	23·94
Denmark ...	351	560	485	606	258	379	521	3,160	41·12
Dwarda ...	...	244	308	388	127	249	185	1,501	20·78
Harvey ...	35	519	783	840	152	472	312	3,113	36·54
Bunbury ...	22	668	587	595	561	338	441	3,192	32·81
Busselton ...	54	372	427	637	179	347	196	2,212	8·60
Balingup ...	58	440	480	555	65	470	303	2,371	34·98
Kulikup ...	127	256	283	359	86	245	262	1,618	22·12
Graldton ...	...	205	682	362	133	261	73	1,724	16·51
Dongarra ...	...	232	709	235	84	249	49	1,645	16·45
Northampton ...	...	249	701	307	133	261	73	1,724	18·03

Illustration I.—Top-dressing at Harvey, 1925.



Compare Illustrations 2 and 3.

It is a well recognised fact by stock husbandmen that legumes contain a greater quantity of nitrogenous compounds, weight for weight (approximately twice as much), than do the grasses proper, and for this reason alone any means whereby their growth can be economically stimulated is of the first importance.

The following table shows that an Autumn top-dressing of a phosphatic manure (superphosphate) gives this desirable result:—

PERCENTAGE OF LEGUMINOUS PLANTS, 1925.

District.	1cwt. Super. per acre.	No Manure.	2cwt. Super. per acre.
Harvey	79	Negligible	94
Denmark	44	10	65
Mt. Barker	89	Negligible	83
Toodyay	58	54	68
Northam	41	Negligible	39
Narrogin	32	do.	72
Katanning	29	do.	71
Dwarda	85	15	75
1925—8 plots	57	10	71
1924—15 plots	65	23	77 (14)
1923— 4 plots	53	38	68
Average, 1923–25	61	20	74
Percentage Increase	305	100	370

Illustration II.—Top-dressing at Harvey, 1925.



Compare Illustrations 1 and 3.

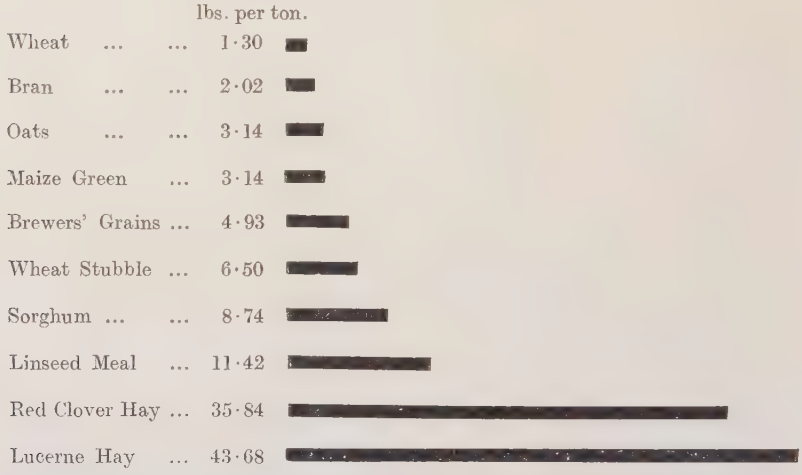
In recent years numerous experiments have been conducted, and are still in progress, with the aim of learning the full significance of minerals in the metabolism of farm animals, especially dairy cattle and swine.

Of all the minerals required by farm stock to maintain health, it has been found that the one most likely to be deficient in the common fodders is lime, followed closely by phosphoric acid. Valuable information on this subject is given in the Departmental Leaflet No. 130, "Minerals and the Health of Cattle," by Mr. A. B. Adams.

Here again leguminous plants are valuable as supplying mineral matter, especially lime, in greater quantities than other classes of common fodders.

This is convincingly illustrated in the following diagram, which gives the pounds of lime found in one ton of some common fodders:—

POUNDS OF LIME IN ONE TON OF SOME COMMON FOODS.



Thus, by increasing the quantity of legumes in a pasture or ration, the two-fold object is gained of—

(1) Supplying a fodder relatively rich in nitrogenous compounds, and thus being able economically to reduce the bran bill; and

(2) Increasing the lime available for stock grazing on that pasture, of especial importance to dairy cattle and all classes of young stock.

The question of increasing the mineral content of pastures does not end, however, with the increased percentage of legumes induced through an application of a phosphatic fertiliser. The idea of the growth of live stock depending on the composition of the forage, and of the latter, in turn, on the composition of the soil, is one which has been shared by many thoughtful stockmen from time to time.

It is well known that the soils of the agricultural areas of Western Australia, indeed, of Australia, are deficient in lime and phosphoric acid. It would seem natural, therefore, to argue that plants grown on such soils would also be deficient in these two minerals, in comparison with similar plants grown on well fertilised soils.

Illustration III.—Top-dressing at Harvey, 1925.



Compare Illustrations 1 and 2. Samples of Subterranean Clover for analysis were taken from this plot and that depicted in Illustration 2.

With the view of proving to what extent this surmise is true, a sample of the herbage growing on the demonstration plots at Mr. F. Middleton's farm, Denmark, and Mrs. C. Grieves, Harvey, was submitted to the Government Mineralogist and Analyst, Dr. E. S. Simpson, for analysis, the results of which are given below:—

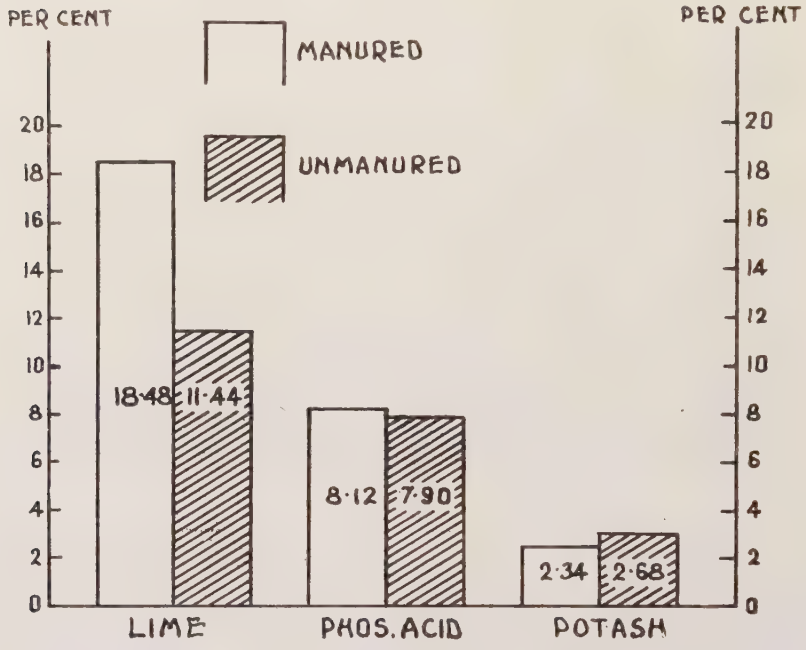
ANALYSIS OF MIXED HERBAGE—DENMARK, 1925.

	1cwt. Super. per acre.	No manure.
	per cent.	per cent.
Moisture	6·04	6·14
Proteins (nitrogenous compounds)	12·62	9·45
Ether Extract (fat)	2·21	2·42
Carbohydrates (starchy)	42·34	45·23
Crude Fibre	29·90	30·25
Ash	6·89	6·51
	100·00	100·00

At first glance in this instance, there does not appear to be a great change in the composition of the herbage due to the application of the fertiliser. An analysis of the ash, however, reveals that the difference in the percentage of lime (CaO) in the two samples is great, as is illustrated in the following diagram. (Fig. 2.) It will be noted that the percentage of phosphoric acid in the *mixed herbage* is unaltered.

A cow giving 3 gallons of milk and grazing on hay from the manured plots would, therefore, only need to consume 11 lbs. of fodder, as against 19 lbs. from the unmanured plot, to supply her *minimum* requirements of lime, *if all the fodder was digestible.*

ANALYSIS OF ASH. DENMARK PLOTS.



A further sample was taken from the demonstration plots at Harvey, where the growth consisted almost entirely of subterranean clover.

In procuring this sample, special care was taken to exclude any herbage other than subterranean clover, as it was desired to ascertain the change in composition due to fertilising with superphosphate, and also to secure an indication of the relative feeding value of this clover, which hitherto had not been analysed in this State. The results, therefore, are of twofold interest:—

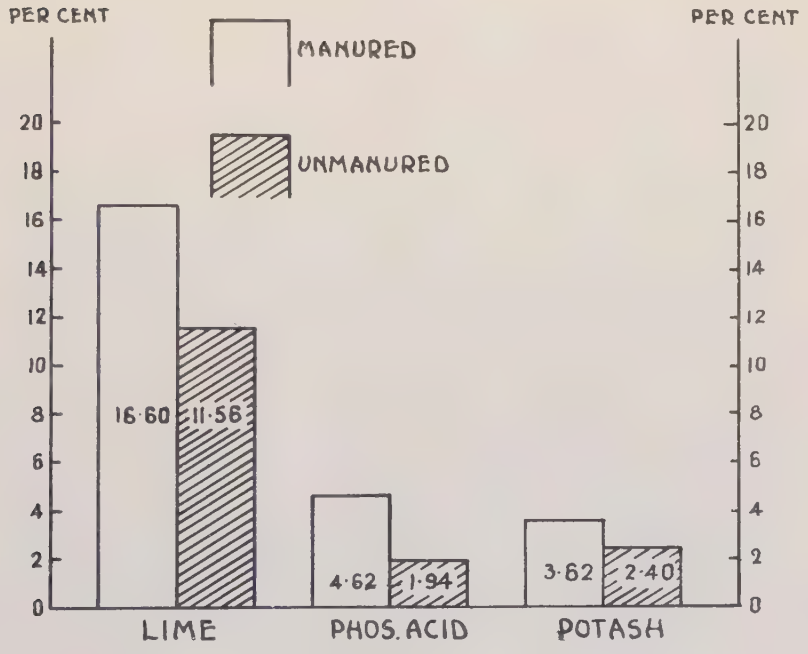
ANALYSIS OF SUBTERRANEAN CLOVER—HARVEY PLOTS, 1925.

	2cwt. Super. per acre.	No Manure.
	per cent.	per cent.
Moisture	9·16	8·49
Ether Extract (fat)	4·20	1·94
Carbohydrates (starchy)	42·95	29·34
Protein (nitrogenous)	19·08	15·40
Crude Fibre	14·12	31·57
Ash	10·49	13·23
Unit Value (Guthrie's basis)	71·48	49·10
	100·00	100·00

One would expect greater differences between the samples grown on manured and on unmanured plots in the case of the subterranean clover from Harvey than between the samples of mixed grasses and clovers from Denmark, as it has been shown earlier in this article that legumes are specially stimulated by phosphatic manures, which is borne out by the above analysis.

In the "manured" sample, the fat is 116 per cent. greater; starchy matter is 46 per cent. greater; nitrogenous matter is 24 per cent. greater than in the "unmatured" sample, while the crude fibre (mostly indigestible) is reduced by 123 per cent. It will be noticed that the ash is greater in the "unmanured" than in the "manured" sample, but this is more than counterbalanced by the differences between the composition of the two "ashes," as is shown in the following diagram.

ANALYSIS OF ASH. SUBTERRANEAN CLOVER.



The increase of lime in the ash of this sample of subterranean clover due to the application of superphosphate is thus shown to be 43 per cent., and of phosphoric acid 138 per cent.

On numerous occasions the writer has noticed evidences of dairy cattle suffering from lime and phosphate deficiency in almost every district of the State, as evidenced by the depraved appetites of the animals, i.e., bone-chewing, dung-eating, etc., and the harsh coats which generally accompany these habits. The above analyses throw a significant light on this subject and are a warning to all stockowners.

If an application of a fertiliser can affect the composition of a fodder to such an extent as in the above examples (and it must be remembered that in neither case was the unmanured plot on virgin country but on land that had been cultivated some years), it is scarcely a matter for surprise that stock running on virgin country and grazing on "feed" grown on that country should suffer from lime and phosphate starvation. One can predict with certainty that, under these conditions, animals must suffer from the lack of these minerals, young growing stock and dairy cattle particularly.

Limitations of Analysis.

Too great an importance is often attached to individual analyses of plants, without due regard being given as to the conditions under which the samples were taken. The above analyses show conclusively that soil conditions exert an immense influence on the feeding quality of plants grown on them as determined by the relative amounts of certain nutrients.

No. 4.



Effect of top-dressing with superphosphate. Mr. D. Ferguson's Farm, Moora.

A sample of a fodder grown on unmanured soil, or on virgin soil, would not stand comparison with a similar sample grown on well fertilised cultivated soil adjacent to the first area, from the point of view of feeding value judged by a chemical analysis. It would be distinctly misleading, therefore, to compare the feeding value of plants grown in different districts by the results of a chemical analysis unless all the conditions as to method of cultivation were given or a large number of samples taken. Experience has shown that analyses are only useful when used for purposes

of comparison between fodders that have been grown under similar conditions. In the comparisons made above, the samples were grown and gathered under as similar conditions as possible, and a comparison in feeding value is therefore justified.

Conclusions.

1. The top-dressing of pastures with a phosphatic manure, preferably superphosphate, is essential to stockbreeders, particularly dairy farmers, for the following reasons:—

(a) Increases the mass of fodder on a pasture by at least 2½ times.

(b) Improves the quality, by specially stimulating the leguminous plants.

(c) Soil is enriched, due to the greater production of manure relatively richer in nitrogenous compounds than heretofore.

(d) All growing stock and milch cows require large quantities of lime and phosphoric acid for the maintenance of health and milk production. These elements are present in leguminous plants in relatively large quantities.

(e) The composition of fodder so fertilised is changed, particularly the composition of leguminous plants. This change, regarding the mineral content, is in the direction of more lime and phosphoric acid.

2. The usefulness of a plant analysis is limited to a comparison of fodders grown under similar conditions.



FALLOW COMPETITIONS.

WONGAN HILLS AGRICULTURAL SOCIETY.

Judge—I. THOMAS, Superintendent Wheat Farms.

In connection with its annual fixture, this Society provided two prizes for fallow competitions—one for the best 50 acres of forest land, and another for 50 acres of light land. It is to be regretted that so few entries were forthcoming. In all there were five—three for the forest land, and two for the light land. These were inspected on the 19th and 20th March, 1926, and the awards made are as hereunder:—

FOREST LAND.

Competitor.	Moisture.	Consolidation.	Mulch.	Absence of weeds.	Preparation.	Total.
	40	20	10	10	20	100
Ackland, R. R. B. ...	38	18	9	8	17	90
Ackland, J. H. ...	34	15	7	9	15	80
Spencer & Sons ...	34	14	7	8	13	75

LIGHT LAND.

Competitor.	Moisture.	Consolidation.	Mulch.	Absence of weeds.	Preparation.	Total.
	40	20	10	10	20	100
Ackland, J. H. ...	38	16	7	8	17	86
Martin, Lewis ...	36	12	6	9	16	79

The competing area of the winner of the competiton on the forest land was an outstanding exhibit having a very attractive appearance. It had been ploughed during late June and early July with a mouldboard plough 4in. deep, when the land was in a suitable condition. In August it was cultivated with a Springtyne implement, and again in October with the same implement; this land was also being cultivated at the time of inspection. The mulch was fairly even, being about 2½in. deep with the sub-surface compact and moist immediately below the mulch. A few young weeds were making their appearance, but these are being destroyed by the present cultivation, which was purposely delayed after the rain the previous week, to allow these weeds to germinate. There were also a few plants of cockspur.

The work carried out preparing this fallow, for the main part, was uniformly and well done. It could be noticed, however, that two of the points of the cultivator were slightly out of adjustment, and there was an odd strip or two where it had missed.

The competing area belonging to Mr. J. H. Ackland was more undulating. It was ploughed during the early part of July with a mouldboard plough 4in. deep. The land being in a suitable condition, it was cultivated with a Springtyne implement in September, October, and February. The mulch was not uniform, although there was a portion which was in fairly good order. On the higher ground the mulch had run together, and in places there was practically none. In these places the sub-surface had become hard, and the moisture was fast disappearing

The initial ploughing appeared to have been carefully carried out, but the subsequent cultivations had been delayed too long after rain to allow the machine to give the required results.

Messrs. Spencer and Sons' competing area was undulating and consisted of different types of soil including Wattle, Jam, and York Gum country. The major portion had been ploughed in July 5in. deep with a mouldboard plough, when the condition of the land was suitable. The balance, about 12 acres, was ploughed in August, but it did not appear as if ploughed to the same depth. The ground was then becoming hard. The Springtyne cultivator was used to cultivate it during September-October, and twice during summer after rain. The mulch was not uniform, being beaten down where sheep had camped, and also by sheep travelling to and from the homestead. In other parts it was broken down too fine by the cultivator. The moisture in the sub-surface varied according to the mulch, as also did the consolidation, which was poor on the area ploughed in August, being too open. A few dead weeds, principally cockspurs, were noticed.

The preparation of this fallow had not been so carefully carried out as was the case with the other two competitors. The depth of ploughing varied, as did also the driving of the cultivator, there being noticed several "bones" left by this machine.

Of the two competitors on light land, Mr. J. H. Ackland was the winner. The soil of his competing area included small gravelly patches. It was ploughed 4in. deep the latter end of July with a mouldboard plough, and was subsequently cultivated with a Springtyne implement early in September, in October, and again in January after rain. The moisture was well up, being immediately below the mulch, which was a little too deep and had not been disturbed after the recent rain. The harrows run over it would have been to advantage. Sheep had been pastured from time to time to assist to destroy weed growth, and they, no doubt, also assisted to consolidate the under-surface, which, considering the type of soil, was good.

Mr. Lewis Martin's area was smoke-bush country, and had been prepared by ploughing with a Sundercut cultivating plough to a depth of 4in. during July and August, and was subsequently ploughed back with the same plough to the same depth during September. This competitor realised that the ploughing back was not to advantage so far as consolidation was concerned, but, to destroy the scrub which was left growing after the initial ploughing, it was found necessary to plough 4in. The moisture was not so good as that of the winner's, and in consequence of the deep cultivation in September the sub-surface was not compacted. The mulch was too level, and in this case, also, a stroke with the harrow would have been to advantage; there were practically no weeds, and the preparation for the major portion had been carefully carried out. There was, however, a small area which had been missed when the rest had been ploughed back.

MOUNT MARSHALL, NUNGARIN, AND BRUCE ROCK.

Judge—H. Rudall, Field Officer.

The fallow competitions organised by the Mt. Marshall, Nungarin, and Bruce Rock Agricultural Societies were inspected during the latter part of March and adjudicated upon according to the following scale of points:—

	Points
Moisture	40
Condition of Mulch	10
Freedom from Weeds	10
Consolidation of sub-surface soil	20
Evenness of Preparation	20
	100

About ten days prior to the commencement of the judging a very steady and beneficial, but an unusually early rain had fallen, which in many districts exceeded an inch. This rain had moistened the soil and sub-surface soil, and in consequence it was extremely difficult to determine at the time of judging to what extent the mulching of the fallowed land, as carried out by the different competitiors, had been effective in conserving the subsoil moisture. It was, however, obvious that many mulches had been too deep, through being worked with certain types of disc implements. In some cases the use of such an implement was unavoidable owing to the ploughed land not having been lightly worked whilst the weeds were young.

The majority of the fallows were remarkably free from weeds, and of those present the summer weed, Californian or Buffalo Burr was the most common, and unless this pest is disturbed when young with the Springtyne cultivator with broad points, some type of a disc implement or a skim plough must be used. When the cultivation thus necessary is deep the seed must, of necessity, be sown in the mulch instead of on the consolidated bed and covered with the mulch.

The Rainfall registered at various centres concerned during the Fallow period is as follows:—

	1925.						1926.			
	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb	To 17th March.	
Gabbin	195	21	131	27	13	164	11	74	118	764
Bencubbin ...	177	14	92	40	12	129	41	70	276	851
Welbungin ...	183	68	117	53	...	70	11	121	120	743
Kwelkan ...	194	23	118	82	12	101	12	81	156	779
Nungarin ...	187	19	98	64	24	114	12	80	228	826
Bruce Rock ...	152	22	128	67	37	71	...	28	114	629
Ardath	108	34	134	60	22	23	...	22	141	544
Bungullapen ...	121	18	138	56	12	28	...	22	132	527

MT. MARSHALL AGRICULTURAL SOCIETY.

Six entries were submitted by the Mt. Marshall (Bencubbin) Society, and the points allotted to each are set out in the table hereunder:—

FALLOW COMPETITION.

Season—1925–26.

Competitor.	District.	Moisture.	Mulch.	Weeds.	Consolidation.	Preparation.	Total.
		40	10	10	20	20	100
Bagshaw, W. ...	Welbungin ...	40	9	9	19	18	95
Hopwood, W. G. B.	Bencubbin ...	40	10	8	18	18	94
Webster, E. ...	do. ...	40	8	7	14	14	83
Bigley, H.	do. ...	40	8	10	12	13	83
Flitcroft, H. ...	Gabbin ...	35	6	5	12	11	69
Weyman, F. C. ...	Bencubbin ...	30	—	10	5	5	50

The winning fallowed area by Mr. W. Bagshaw was ploughed in June, 1925; cultivated with the Sundercut in August; with the Springtyne in October and December, and harrowed in February. The land was almost free from weeds, and well supplied with moisture. The mulch was of a nice even depth, although a trifle too fine in places, causing it to run together. Consolidation was excellent, and with another harrowing or light cultivation the preparation would have been complete.



Fallow Competition (Mt. Marshall Society). Examining for moisture contents.

Mr. Hopwood's entry was also very creditable. It was ploughed in July, 1925, and cultivated with the Springtyne cultivator in the middle of September; in early November the Tandem disc harrows were used; cultivated with the Springtyne cultivator in the middle of January; and lightly culti-

vated with the disc plough in February. There were a few more weeds than on the winning fallow. The mulch was excellent, but the consolidation was not quite equal to the first award.

Mr. Webster's entry was ploughed in June, 1925, and cultivated with the Sprintyne cultivator in August, September, December, and February. The mulch was rather deep, hence too little consolidation. A little weed growth, including sarsaparilla, also stumps and roots ungathered did not add to the appearance.

Mr. Bigley's entry was ploughed in May, 1925; disc cultivated in September, and cultivated with the Springtyne cultivator in October and February. The depth of ploughing was irregular. In places the mulch was too deep, and on the more clayey parts there was no consolidation. There were practically no weeds, but small stumps lying on the surface destroyed its appearance as an exhibition area

Mr. Flitcroft's entry was ploughed in July, and cultivated with the Tandem disc in September, and with the Springtyne shortly after. The depth of ploughing was not deep enough; mulch was very inferior, and cultivation and preparation uneven. Self-sown wheat and mustard were very prevalent.

Mr. Weyman's entry was ploughed in July, 1925, and no further workings had been given. The points awarded to this entry need no further comments.

NUNGARIN AGRICULTURAL SOCIETY.

Six entries were submitted by the Nungarin Agricultural Society, and the awards made were as follows:—

FALLOW COMPETITION.

SEASON—1925–26.

Competitor.	District.	Moisture.	Mulch.	Weeds.	Consolidation.	Preparation.	Total.
		40	10	10	20	20	100
Goode, Eric H. ...	Nungarin ...	40	8	9	18	18	93
Williams, F. A. ...	do. ...	40	8	9	18	17	92
Stagg, W. N. ...	do. ...	35	8	9	15	17	84
Creagh, Bros. ...	Kwelkan ...	35	7	9	15	17	83
Patterson, A. ...	do. ...	35	7	8	14	17	81
Watson Bros. ...	Nungarin ...	30	5	7	10	10	62

The winning fallow entered by Mr. Eric H. Goode was both interesting and educational. A large proportion of the block was fluffy morrel soil. It was ploughed in July, 1925; reploughed lightly in August, and from that month to the date of inspection, *i.e.*, 20th March, 1926, six harrowings had been given whilst the soil was wet, the last one immediately the soaking rain on the 9th March had ceased.

The depth of ploughing, about three inches in the wet, was sufficient, and the subsequent workings whilst the soil was wet presented a nice mulch of 1½ inches, and about 2 inches firm, yet springy, consolidated soil full of

moisture. The fault in this fallow was that the small quantity of clay soil on the top end of the block had not been ploughed and cultivated more deeply. A few weeds were noticed on the clay portion.

Mr. William's entry presented a very pleasing appearance. It was ploughed in June, 1925; cultivated lightly with the Sundercut in August; harrowed in September, October, and part harrowed in January, and cultivated with the Springtyne in February. The ploughing was a little uneven, also the consolidation, although the latter was nice and mellow. The mulch, except in the lighter soil, was of an even depth—about 2 inches. A few weeds were noticed.

Mr. Stagg had ploughed his land in June and July with a 10-furrow disc plough; cultivated with the same implement in September; with the Springtyne the end of October, and partly done with the same implement in March. The ploughing showed very uneven depths, and the subsequent cultivations were too deep. In places there was no consolidation but all mulch, and in others the mulch was too little.

Messrs. Creagh Bros. entry was ploughed in July and August, 1925, and cultivated with the Springtyne in September and February. This had been toned down and presented a nice appearance to the eye, but on examination showed the workings to be irregular, as on Mr. Stagg's land. A few points more would have resulted from cultivating with the Springtyne after the rain on the 8th and 9th March.

Mr. Patterson's entry was ploughed in July; disc cultivated in September, and with the Springtyne in October and February. The workings of this block, to use the term "first class" fallow, would have had to have been very constant and patchy owing to the numerous types of soil spread throughout; the stiff cement clay being the hardest to catch before the moisture evaporated—hence the workings were very uneven. Large clods without fine soil below allowed free evaporation, and in other places the mulch and consolidation were insufficient.

Messrs. Watson Bros.' entry showed the ploughing had been done very unevenly. Very little cultivation (if any) had been given since Spring. Stumps and roots were scattered about showing a lack of interest to obtain the maximum result, which some of that good land would produce.

BRUCE ROCK AGRICULTURAL SOCIETY.

H. RUDALL, Judge.

There were ten entries in the Bruce Rock Society's competition, and the awards made were as hereunder:—

SEASON 1925–26.

Competitor.	District.	Moisture. 40	Mulch. 10	Weeds. 10	Consolidation. 20	Preparation. 20	Total. 100
Haggerty, H. J. ...	Yerapin	40	10	10	18	18	96
Brown, A. W. J. ...	Ardath	40	9	10	18	18	95
McCarthy, P. & Son ...	Eujinyn	40	10	10	18	17	95
Brown, S. A.	Bungullapin ...	38	9	10	17	18	92
Lethlean, J.	Bruce Rock ...	36	9	10	16	16	87
Allen Bros.	Kuminin	35	7	10	15	15	82
Farrell, F. C.	Eujinyn	35	8	8	15	16	82
Taylor, F. J. D. ...	Bruce Rock ...	35	8	10	12	13	78
Higgs, Jos.	do.	30	6	7	10	10	63
Cusbert, L. C.	do.	30	5	6	8	10	59

Mr. Haggerty's entry could be justly termed a well worked fallow. It was ploughed in June; harrowed the first week in August; cultivated with the Springtyne at the end of that month; harrowed in September; cultivated and harrowed in October; harrowed in December and February; cultivated with the Springtyne after the rain on 9th March, and again harrowed after rain on 18th March. This is an instance of intense cultivation to conserve maximum amount of moisture and plant food manufactured. I am of the opinion that if the Springtyne had been used in August instead of the harrows the future workings would have been more even. There were no weeds, and, as might be expected, the moisture had been well conserved.

Mr. A. W. J. Brown's entry was a credit to him, having been well ploughed in July, 1925; cultivated with the Sundercut towards the end of August; with the Springtyne in October; and again twice in March with the same implement. There were no weeds, and the moisture contents very full.

Messrs. P. McCarthy & Son, who have been consistent competitors, presented another entry of high class order. It was ploughed in June; scarified in August; cultivated with the Springtyne in September; scarified in October, and again cultivated with the Springtyne after rain on 9th and 10th March. The scarifying in August had been to the full depth of ploughing, and no ribs were seen on the surface of the subsoil. Consolidation was almost perfect, the mulch likewise, except in a few places, which showed the sod in those places had dried out rapidly, and on the first scarifying had broken rather lumpy, in which spots hardly enough fine soil was available for a complete mulch. A stroke of the harrows after the rain a week prior to my visit would have added to the appearance.

Mr. S. A. Brown's entry showed a very marked improvement on that which I judged two years ago. It was ploughed the middle of July, 1925; cultivated with the Sundercut in August; with the Springtyne, and harrowed, in October, and again after the rains on 11th and 23rd March. The depth of ploughing was irregular owing to the variety of soils from sandy to stiff clay. If the cultivation with the Sundercut in August had been deeper the lower portion of the subsurface soil would not have set so hard, especially in the stiffer nature of clay. The cultivation, which was almost completed during my inspection, was slightly too deep to allow the seed to rest on or near the firm moist seed bed.

Mr. Lethlean's entry was not up to his usual standard. It was ploughed in June, 1925, and cultivated with the Springtyne in October, February, and March. This block was used as a feed paddock during the winter and early Spring, hence the ploughing was thoroughly consolidated and the first cultivation with the Springtyne created a nice rubbly mulch. The mulch was hardly deep enough to have prevented evaporation during January. The moisture found in the subsoil was not equal to that found in the leading competitor's land.

Messrs. Allen Brothers' workings had been very uneven, and, in consequence, the surface of the subsoil was very ribby. The sub-surface soil was very stiff owing to the first cultivation not being deep enough. Part of the block—about 40 acres—was being cultivated on my visit, and part—10 acres—owing to the traffic of sheep, had lately been disc ploughed, but not yet toned down. The mulch on the cultivated part was a trifle deep, and the portion disc ploughed would have no nicely consolidated sub-surface.

Mr. F. C. Farrell's entry was ploughed in January, 1925; cultivated with the Sundercut in September; partly harrowed in December; harrowed between December and March, and cultivated with the Springtyne on 19th March. The cultivating with the Sundercut in September, after the land was undisturbed for nine months, should have been in the nature of a late ploughing, and not cultivation. The Sundercut had made the surface depth very uneven and ribby. The mulch, which had been stirred the day prior to my visit, was very uneven, strips having been missed showing a baked crust and stinkwort shooting freely in places.

Mr. Taylor's land was ploughed in July; cultivated with disc harrows in September, and lightly cultivated with the Springtyne three times from September to February. On this block the ploughing was far too shallow, and the mulch, which was good, did not allow very much consolidation between that and the depth of ploughing. The moisture had been supplied by the rains previous to my visit. The tynes of the cultivator had worked very unevenly. There were no weeds.

The block exhibited by Mr. Higgs appeared to have been lately cultivated with the Springtyne. The mulch made by the Springtyne was too deep as the result of an effort having been made to disturb the dry barley grass. There were many butts still remaining undisturbed. But for the rain the consolidation would have been practically nil. Large clods were still embedded as left by the plough, and the moisture was evaporating quickly.

Mr. L. C. Cusbert's block was ploughed in July; cultivated with the Sundercut at the end of September, and with the Springtyne in October. There were no further workings and practically no mulch. Large lumps were embedded in the surface soil causing evaporation. Weeds were flourishing as the result of the late rains.



FIELD EXPERIMENTS AT CHAPMAN EXPERIMENT FARM.

I. THOMAS, Superintendent of Wheat Farms, and
P. JEFFERY, Manager.

MULCHING EXPERIMENT.

The object of this experiment is to determine how far and under what conditions the cultivation of winter fallowed land is profitable.

The soil on which this experiment was carried out had been cleared mostly of jam trees with a sprinkling of York gums. The plots were fallowed and were ploughed with a mouldboard plough 4 inches deep during July, 1924, and were cultivated with a springtyne cultivator when required for the carrying out of the experiment.

Sheep were depastured on all plots from time to time during the fallowed period to destroy weeds.

Prior to this year the plots were not repeated, as is now the custom; in accordance with the original methods larger plots, half an acre in area and the width of four drills, were used. This year the plots were smaller and only the width of the drill. They were, however, repeated eight times, five of the sections being harvested for grain and three for hay.

In each section—

No. 1 Plot was cultivated on the 13th of September, October 7th and 23rd, November 22nd, February 28th, March 3rd and 7th, and finally prior to seeding. At planting the plots were in excellent order.

No. 2 Plot was cultivated on the 13th of September, and again prior to seeding. These plots, although in fairly good order, were inclined to be cloddy.

No. 3 Plot, representing neglected fallow, was only cultivated prior to seeding. These plots planted were rough, and dead grass was noticeable.

The plots were planted on the 1st May with the variety "Nabawa" at the rate of 45lbs. of graded seed per acre; superphosphate (22 per cent.) was applied at the rate of 90lbs. per acre.

The seasonal rains commenced a fortnight after planting. The rainfall for the year under review, together with the averages for the past twenty years, is as hereunder:—

RAINFALL RECORDED AT THE CHAPMAN EXPERIMENT FARM.

Year.	Jan.	Feb.	Mar.	Apl.	Growing Period.						Total growing period.	Nov.	Dec.	Total.
					May	June	July	Aug.	Sep.	Oct.				
1925 ...	35	25	102	2	250	748	324	106	242	82	1,752	26	84	2,026
Average 20 years ...	30	55	48	38	225	411	389	272	165	96	1,558	21	20	1,770

The results obtained this year, together with the average yields to date, are shown in the table herewith:—

CHAPMAN EXPERIMENT FARM.

MULCHING EXPERIMENT, 1925.

Variety, Nabawa. Planted April 29th. Seed, 45lbs. Superphosphate, 80-90lbs.

HAY YIELDS.

Treatment.	Computed Yields per Acre. Sec. 1.	Sec. 2.	Sec. 3.	Per Acre Average, 1925.	Percentage, 1925.	Per Acre Average, 1914-1925.	Percentage, 1914-1925.
	C. Q. L.	C. Q. L.	C. Q. L.	C. Q. L.		C. Q. L.	
Mulched in spring, after rain during summer, and before planting	36 3 12	42 2 0	32 3 12	37 1 17	98	27 0 0	107
Mulched in spring and before planting only	37 3 4	38 0 0	38 3 12	38 0 24	100	25 1 4	100
Muched before planting only	31 0 0	36 0 8	34 2 8	33 3 12	89	20 3 20	83

GRAIN YIELDS.

Treatment.	Computed Yields per Acre. Sec. 1.	Sec. 2.	Sec. 3.	Sec. 4.	Sec. 5.	Per acre Average, 1925.	Percentage, 1925.	Per acre *Average, 1914-25.	Percentage, 1914-25.
	bus. lbs.	bus. lbs.	bus. lbs.	bus. lbs.	bus. lbs.	bus. lbs.		bus. lbs.	
Mulched in spring, after rain during summer, before planting	24 32	25 44	†	25 52	27 12	25 50	99	16 16	104
Mulched in spring and before planting only	24 24	26 48	26 24	26 16	26 0	25 58	100	15 36	100
Mulched before planting only	23 20	24 0	26 0	25 20	19 36	23 39	91	14 8	91

* Plots 1924 cannot be included having been destroyed by fire. † This plot is so obviously below normal and is therefore not included in the averages.

FEEDING CALVES.

When skim milk is substituted for whole milk in feeding the calf, something needs to be added to replace the butter fat removed in the cream. Corn can be used to good advantage. It is better cracked than ground fine. Bran is good, and ground oats are splendid. A mixture is better than just one of them. The calf will begin to eat feed when two or three weeks old, and should have access to it. The best way to feed grain is dry, and care should be taken not to allow any of it to remain in the corners of the feeding box, as it will scour, and may cause digestive troubles. Boiled ground flax seed is also used with skim milk to make up for the fat removed.

FIELD EXPERIMENTS AT MERREDIN EXPERIMENT FARM.

I. THOMAS, Superintendent Wheat Farms, and
J. H. LANGFIELD, Manager.

MULCHING EXPERIMENT.

This experiment was commenced in 1915, and since then it has been carried out continuously each year. Prior to this year the plots were larger and not repeated; this year they were made narrower—the single width of a drill—and repeated eight times.

The plots required for the experiment were fallowed and ploughed 4in. deep with a heavy disc plough during June, 1924, and were cultivated with a springtyne implement when required for the carrying out of the experiment.

In each section plot No. 1 was cultivated in September and during summer after rain sufficient to form a crust, thus maintaining a mulch throughout the fallowed period. Plot No. 2 was cultivated in September and again prior to seeding. Plot No. 3 was treated as the neglected fallow of some farmers. After the initial operation of ploughing in June it was left uncultivated until just prior to seeding.

The plots were planted on the 25th April with "Nabawa" seed at the rate of 45lbs. per acre, with an application of 90lbs. of superphosphate.

The germination on plots No. 1 was very good; on plots No. 2 it was not so even, and on plots No. 3 it was both slow and uneven. As the seasonal rain did not commence until after the middle of May the plots did not germinate until a month after planting.

The rainfall for 1924 and 1925, together with the average for the past fourteen years, is herewith:—

RAINFALL RECORDS -MERREDIN EXPERIMENT FARM.

Year.	Jan.	Feb.	Mar.	Apl.	Growing Periods. May.	June.	July.	Aug.	Sep.	Oct.	Total growing Period.	Nov.	Dec.	Total.
1925 ...	235	136	43	27	104	147	134	18	98	53	544	5	26	1,026
1924 ...	...	27	68	48	215	227	102	189	139	208	1,080	46	3	1,272
Average 14 years ...	68	62	83	80	135	184	192	146	99	90	847	40	64	1,243

The season was not a good one; at no time was there any surplus moisture in the soil, and finally during a very critical period ending the second week in September no useful rain was recorded.

The plants on all plots were uneven in height, some patches having made fairly good growth, whilst in other patches the crop was very short and the heads small.

The results of this year's experiment, both for hay and grain, are as hereunder, together with the average yields to date:—

MERREDIN EXPERIMENT FARM.

MULCHING EXPERIMENT, 1925.

Variety, Nabawa. Planted April 25th. Seed, 45lbs. Superphosphate, 90lbs.

HAY YIELDS.

Treatment.	Computed Yields per Acre.			Per Acre Average, 1925.	Percentage, 1925.	Per Acre Average, 1914-1925.	Percentage, 1914-1925.
	Sec. 1.	Sec. 2.	Sec. 3.				
	C. Q. L.	C. Q. L.	C. Q. L.	C. Q. L.		C. Q. L.	
Mulched in spring, after rain during summer, and before planting	21 1 4	21 1 12	20 1 4	20 3 25	112	48 1 20	104
Mulched in spring and before planting only	18 3 12	18 0 24	19 0 0	18 2 21	100	46 2 0	100
Mulched before planting only	14 2 24	14 1 20	15 2 0	14 3 15	79	45 3 20	99

GRAIN YIELDS.

Treatment.	Computed Yields per Acre.					Per acre Average, 1925.	Percentage, 1925.	Per acre Average 1914-25.	Percentage, 1915-25.
	Sec. 1.	Sec. 2.	Sec. 3.	Sec. 4.	Sec. 5.				
	bus. lbs.	bus. lbs.	bus. lbs.	bus. lbs.	bus. lbs.	bus. lbs.		bus. lbs	
Mulched in spring, after rain during summer, and before planting	19 12	16 56	15 36	15 52	16 24	16 48	121	22 48	104
Mulched in spring and before planting only	16 8	12 24	13 4	12 0	15 28	13 49	100	22 0	100
Mulched before planting only	13 52	10 8	12 48	10 32	15 20	12 32	90	20 48	95

The results obtained this year at both the Chapman and Merredin Experiment Farms again confirm the conclusions and recommendations that have been made from previous results obtained each year since 1914, namely, that the general practice should be to cultivate the fallowed land in spring, and again prior to seeding, and that in cases where the ground is weedy this cultivation should be supplemented by additional cultivation after rain during summer. Further, as shown by the results obtained at Merredin the last two years, when the rainfall during the critical period of August and September was deficient, spring and summer cultivation not only destroy weed growth but also act as an insurance against a period of short rainfall.

EARLY AND LATE FALLOWING EXPERIMENT.

The object of this experiment is to determine whether ploughing the fallow early or late has any effect on the yields of the resultant crop. This experiment has been conducted for the past two years on heavy forest land. For the purpose of the experiment two plots were used.

This year Plot No. 1 was ploughed four inches deep with a disc plough during the first week in June of the previous year. At the time of ploughing the soil was in good condition for the work and broken up to an even depth.

Plot No. 2, which was delayed until the last week in August in accordance with the requirements of the Experiment, was very hard and could not be ploughed evenly; in some places it was not possible to plough more than a couple of inches deep.

Both plots received the same cultivation, viz., in September and again in March with a Springtyne cultivator, and in April with a tandem disc cultivator.

The plots were planted on the 24th of April with the variety "Nabawa" at the rate of 45 lbs. per acre and superphosphate at the rate of 90 lbs. per acre. During May the plots were harrowed after rain, but prior to the germination of the seed.

The results of the trials this year are set out in the table herewith, together with the average for the two years the experiment has been conducted.

MERREDIN—EARLY AND LATE PLOUGHING EXPERIMENT, 1925.

Planted 24th April. Seed 45lbs. Superphosphate 90lbs. Variety "Nabawa."

GRAIN YIELD.

Date of Ploughing.	Computed Yield per acre.		Percentage.	Average Yield, 1924–1925.		Percentage, 1924–1925.
	bus.	lbs.		bus.	lbs.	
June 1, 1924	15	20	100	23	4	100
August 28, 1924	11	23	74	19	24	84

HAY YIELD.

Date of Ploughing.	Computed Yield per acre.			Percentage.	Average Yield, 1924–25.			Percentage, 1924–25.
	cwt.	qrs.	lbs.		cwt.	qrs.	lbs.	
June 1, 1924	24	0	24	100	34	3	4	100
August 28, 1924	17	2	8	73	29	0	24	84

OAT VARIETY TRIALS.

In these trials nine varieties were compared, the variety "Burt's Early" being used as a control.

The land, which was heavy forest country, was fallowed and ploughed 4in. deep with a heavy disc plough during the month of June, 1924. It was cultivated with a Springtyne cultivator in September, March, and April, and with a Tandem disc cultivator in April prior to seeding.

Each series of plots were repeated eight times, five sections being harvested for grain and three for hay. The germination was good, but the growth was poor until the end of August, when, with the advent of rain in September, they improved and made splendid growth.

The results of the trials this year, together wth the average results of previous years in which they have been conducted, are shown in the table hereunder:—

MERREDIN EXPERIMENT FARM.

OAT VARIETY TRIALS, 1925.

Planted 17th April. Seed, 36lbs. per acre. Superphosphate (22 %) 90lbs. per acre.

HAY YIELDS.

Variety.	Computed Yield per Acre.			Average Yield, 1925.	Percentage, 1925.	Average Yield, 1923-1925.	Percentage, 1923-1925.
	Sec. 1.	Sec. 2.	Sec. 3.				
	C. Q. L.	C. Q. L.	C. Q. L.	C. Q. L.		C. Q. L.	
Burt's Early (control)	16 1 4	14 2 0	13 0 16	14 2 16	100	32 2 16	100
Mulga	16 2 8	15 2 0	15 1 4	15 3 4	111	40 2 8	112
Guyra	16 1 4	13 1 4	16 2 8	15 1 15	110	38 2 24	110
Glen Innes No. 7 ...	14 1 20	12 2 8	15 2 16	14 0 24	104	...	...
Fulgham	13 0 8	10 3 12	14 1 4	12 2 27	96	...	...
Burt's Early (control)	12 3 20	11 0 0	14 3 12	12 3 20	100	...	...
Algerian	11 1 4	9 1 20	12 3 4	11 0 19	86	34 3 20	98
Ruakura	13 0 0	10 2 16	12 0 16	11 3 20	92	37 3 12	107
Lachlan	13 1 12	11 2 24	12 0 16	12 1 17	96	38 0 0	107
Wilga	13 1 12	10 2 8	11 2 8	11 3 9	91	35 1 12	101
Burt's Early (control)	15 1 4	11 0 0	12 3 20	13 0 8	100	34 2 8	100

GRAIN YIELDS.

Variety.	Computed Yield per Acre.					Average Yield, 1925.	Percentage, 1925.	Average Yield, 1923-25.	Percentage, 1923-25.
	Sec. 1.	Sec. 2.	Sec. 3.	Sec. 4.	Sec. 5.				
	bus. lbs.	bus. lbs.	bus. lbs.	bus. lbs.	bus. lbs.	bus. lbs.		bus. lbs.	
Burt's Early (control)	12 32	13 16	15 16	11 0	15 32	13 27	100	24 8	100
Mulga	24 16	24 32	23 24	20 32	19 32	22 27	161	29 8	119
Guyra	20 0	22 32	23 0	21 32	19 32	21 11	149	30 16	123
Glen Innes No. 7	23 8	23 0	21 32	21 8	17 32	21 16	147	...	...
Fulgham ...	22 32	22 0	20 8	19 8	17 16	20 13	138	...	...
Algerian ...	17 32	18 24	10 0	15 24	15 24	15 21	103	31 0	125
Ruakura ...	23 0	27 16	21 32	21 8	21 24	23 0	149	32 24	131
Lachlan ...	17 32	19 32	14 24	18 24	15 8	17 8	109	26 24	105
Wilga	21 16	21 0	15 24	17 24	16 16	18 16	115	30 8	120
Burt's Early (control)	15 24	17 16	15 32	16 16	16 16	16 13	100	25 24	100

In addition to a comparison of the results being made for both hay and grain, observations were also made in connection with their comparative value for early green feed. Up to the present "Burt's Early" has been recommended as being most suitable for this purpose, but this distinction is being somewhat challenged by some of the newer varieties. Of these "Mulga" is the most promising, as it not only makes good early growth but is also a good yielder for both hay and grain.

WHEAT VARIETY TRIALS, 1925.

This is the third year of this experiment under the present system, and again sixteen varieties were tested with Gluyas Early as a control. The control was planted at the commencement of each section, and from then on after each four varieties. Each section was repeated eight times, five of which were harvested for grain and three for hay.

The land was disc ploughed four inches deep in June, 1924; cultivated with a Springtyne cultivator in September, again in March, and with a tandem disc in April. Seeding took place on the 14th May at the rate of 45 lbs. per acre with 90 lbs. superphosphate. The whole plot was harrowed after 54 points of rain on the 21st May.

Germination was fairly good, but a small amount of malting did occur.

The results of both hay and grain sections are given below, together with the average percentage for the three-year period 1923-1925, inclusive.

MERREDIN EXPERIMENT FARM.

WHEAT VARIETY TRIALS, 1925.

Planted 14th May. Seed 45lbs. Superphosphate 90lbs.

GRAIN YIELDS.

Variety.	Computed Yield per Acre.										Average, 1925.		Percentage, 1925.	Percentage. 1923–25.
	Sec. 1.		Sec. 2.		Sec. 3.		Sec. 4.		Sec. 5.					
	bus.	lbs.	bus.	lbs.	bus.	lbs.	bus.	lbs.	bus.	lbs.	bus	lbs.		
Gluyas Early ...	18	0	7	20	14	56	14	24	17	4	14	21	100	100
Yandilla King ...	18	40	8	32	14	0	16	24	16	40	14	51	102	103
Wannon	16	0	8	56	12	0	15	36	14	0	13	18	91	86
Federation	14	32	10	0	11	36	14	56	13	20	12	53	87	97
Nizam	16	8	9	28	12	0	16	0	13	52	13	30	90	88
Gluyas Early ...	17	36	10	0	14	24	17	28	15	44	15	2	100	100
Nabawa	22	8	11	44	16	56	20	24	17	20	17	42	116	108
Merredin No. 2 ...	13	4	5	52	9	36	13	28	9	20	10	16	66	...
Gallipoli (58/1) ...	19	20	14	40	15	20	19	36	15	12	16	50	108	104
Gresley	15	52	10	48	11	36	12	24	10	16	12	11	75	90
Gluyas Early ...	19	12	15	4	15	52	17	12	14	48	16	26	100	100
Carrabin	18	16	13	12	14	24	15	12	13	4	14	50	90	93
Comeback	13	12	10	0	10	32	11	20	8	48	10	46	65	...
Nungarin	15	4	11	28	12	48	13	44	8	48	12	22	73	89
Merredin	18	16	12	8	16	40	16	32	8	48	14	29	85	96
Gluyas Early ...	20	0	15	52	18	0	18	0	13	52	17	9	100	100
Canberra	20	40	15	52	18	8	18	24	13	36	17	20	102	105
Merredin No. 15 ...	17	12	12	24	14	56	16	32	12	40	14	45	89	...
S.H.J.	14	32	9	44	12	8	12	32	9	52	11	46	72	...
Florence	10	32	8	0	9	28	9	12	7	52	9	1	56	70
Gluyas Early ...	18	40	14	32	15	52	15	28	15	28	16	0	100	100

MERREDIN EXPERIMENT FARM.

WHEAT VARIETY TRIALS, 1925.

Planted 14th May. Seed 45lbs. Superphosphate 90lbs.

HAY YIELDS.

Variety.	Computed Yield per Acre.									Average, 1925.			Percentage, 1925.	Percentage, 1923–25.
	Section 1.			Section 2.			Section 3.							
	cwt.	qrs.	lbs.	cwt.	qrs.	lbs.	cwt.	qrs.	lbs.	cwt.	qrs.	lbs.		
Gluyas Early ...	27	0	8	13	0	0	20	1	4	20	0	13	100	100
Yandilla King ...	19	2	16	8	0	0	13	2	8	13	2	27	66	85
Wannon	18	2	0	6	1	20	13	0	24	12	2	24	60	80
Federation	23	2	24	8	2	16	18	1	20	16	3	20	78	90
Nizam	20	2	0	6	2	24	16	0	8	14	1	20	65	73
Gluyas Early ...	29	0	24	14	2	24	24	0	8	22	2	19	100	100
Nabawa	25	0	8	12	1	20	19	3	4	19	0	11	86	85
Merredin No. 2 ...	24	0	0	11	1	12	16	3	20	17	1	20	80	...
Gallipoli (58/1) ...	19	3	12	10	1	4	15	3	20	15	1	12	72	78
Gresley	20	3	4	12	1	12	18	1	20	17	0	21	82	96
Glyuas Early ...	22	3	20	16	0	24	22	1	20	20	2	3	100	100
Carrabin	15	0	16	12	1	4	17	1	4	14	3	17	74	87
Comeback	12	0	16	12	1	20	15	2	24	13	1	20	68	...
Nungarin	11	2	24	15	0	16	20	0	16	15	2	19	80	87
Merredin	11	1	4	15	2	16	20	1	4	15	2	27	82	89
Gluyas Early ...	13	0	16	19	2	0	23	3	4	18	3	7	100	...
Canberra	11	0	0	17	0	16	22	3	4	16	3	25	92	102
Merredin No. 15 ...	10	2	16	13	0	16	20	1	20	14	2	27	81	...
S.H.J.	9	0	8	8	2	16	18	3	20	12	0	24	69	...
Florence	10	3	20	12	2	24	16	2	16	13	1	20		90
Gluyas Early ...	14	0	16	15	3	4	21	0	16	17	0	3		100

CHAPMAN EXPERIMENT FARM.

I. THOMAS, Superintendent of Wheat Farms, and
P. JEFFERY, Manager.

This experiment has been carried out under the present system since 1923, and last year twelve varieties were tried with Gluyas Early as a control. There is a considerable variation in the soil at this farm, which makes it difficult to obtain sufficient area of even type for an experiment of this size. This is overcome as far as possible by the use of various plots and repetitions of these as embodied in the method of conducting these experiments.

The land was ploughed four inches deep with a Mouldboard plough in July, 1924, all weed growth being well covered. It was cultivated in September, in October, and again in May, this latter being just prior to seeding. The land at this time was free from weed growth and in good moist condition. Seed treated with dry copper carbonate as a fungicide was sown on the 16th May at the rate of 45lbs. per acre with 80 to 90 lbs. superphosphate.

The plots were one-eighth acre, each section being repeated eight times. Three of these were harvested for hay at the beginning of October, and the remaining five for grain early in November.

The results for this year, together with the percentage results over the period 1923-1925, are shown hereunder.

CHAPMAN EXPERIMENT FARM.

WHEAT VARIETY TRIALS, 1925.

Planted 14th May. Seed 45lbs. Superphosphate 80 to 90lbs.

GRAIN YIELDS.

Variety.	Computed Yield per Acre.										Average, 1925.		Percentage 1925.	Percentage 1923-1925.
	Sec. 1.		Sec. 2.		Sec. 3.		Sec. 4.		Sec. 5.					
	bus.	lbs.	bus.	lbs.	bus.	lbs.	bus.	lbs.	bus.	lbs.	bus.	lbs.		
Gluyas Early ...	15	44	17	20	17	52	18	0	18	0	17	23	100	100
Yandilla King ...	11	20	13	28	14	8	14	0	14	48	13	33	80	92
Wannon	9	4	12	24	11	12	11	44	11	4	11	6	66	...
Gallipoli	15	52	16	48	15	52	15	12	15	52	15	55	95	...
Nizam	13	52	12	56	14	40	12	48	13	12	13	29	82	...
Gluyas Early ...	16	56	16	48	16	0	15	20	15	28	16	6	100	100
Nabawa	16	48	17	36	16	16	17	4	15	44	16	42	103	103
Gresley	18	0	17	52	17	28	17	52	16	48	17	36	108	112
Comeback	13	44	14	0	13	4	13	12	12	48	13	22	80	89
Carrabin	14	24	15	28	14	40	14	24	14	24	14	40	89	89
Gluyas Early ...	15	36	16	56	17	28	16	32	16	0	16	30	100	100
Merredin	15	28	16	32	16	8	15	36	14	40	15	42	97	108
S.H.J.	16	40	15	44	15	28	14	56	14	16	15	25	91	90
Merredin No. 2 ...	17	4	17	12	16	32	15	44	16	40	16	38	96	...
Merredin No. 15 ...	15	20	13	52	13	28	13	4	13	20	13	49	79	...
Gluyas Early ...	18	40	17	36	17	36	17	52	17	12	17	47	100	100

CHAPMAN EXPERIMENT FARM.

WHEAT VARIETY TRIALS, 1925.

Planted 14th May. Seed 45lbs. Superphosphate 80/90lbs.

HAY YIELDS.

Variety.	Computed Yield per acre.									Average, 1925.			Percentage, 1925.	Percentage 1923–25.
	Section 1.			Section 2.			Section 3.							
	cwt.	qrs.	lbs.	cwt.	qrs.	lbs.	cwt.	qrs.	lbs.	cwt.	qrs.	lbs.		
Gluyas Early ...	22	3	12	23	3	4	22	2	16	23	0	11	100	100
Yandilla King ...	15	2	8	17	3	4	16	2	0	16	2	13	71	72
Wannon	16	1	20	18	2	8	17	2	0	17	2	0	74	...
Gallipoli	17	2	24	21	0	8	19	0	8	19	1	4	81	...
Nizam	15	2	16	20	0	0	21	3	12	19	0	19	80	...
Gluyas Early ...	23	0	16	24	1	20	25	0	8	24	0	24	100	100
Nabawa	19	0	24	19	0	16	19	3	12	19	1	17	82	74
Gresley	21	2	24	20	3	20	20	3	4	21	0	16	91	99
Comeback	21	0	0	17	3	4	22	2	0	20	1	20	90	91
Carrabin	14	3	12	17	0	0	19	2	24	17	0	21	78	80
Gluyas Early ...	19	2	16	20	2	8	24	2	24	21	2	16	100	100
Merredin	17	0	0	19	0	0	21	0	24	19	0	8	87	92
S.H.J.	17	1	12	19	3	12	24	0	16	20	1	23	92	90
Merredin No. 2 ...	16	2	24	17	2	8	19	2	24	18	0	0	79	...
Merredin No. 15 ...	18	2	0	17	1	20	19	3	20	18	2	13	81	...
Gluyas Early ...	25	0	8	21	1	4	23	2	24	23	1	12	100	100



BRANDING OF STOCK.

A. ARNOLD,
Registrar of Brands.

In connection with the branding of stock in Western Australia, it was early recognised that, instead of allowing each owner to imprint on either horses or cattle, or any other animals, any mark he deemed fit or fancied, some recognised method of registration and classification was necessary, hence the framing of the 1881 Act. Under this measure each owner was compelled to register a brand, which might consist of any letter, figure, character, or a combination of such, but on no account was stock to be marked with an unregistered brand. Every care was taken to avoid dual registration, but with such a heterogeneous mass as was ultimately registered, such as outlines of pipes of every shape, horseshoes, tridents, spectacles, and all the different shaped stars and moons of the universe, intermingled with letters and figures in all forms of enclosures, with half circles and lines both straight and crooked above and beneath them, it will be seen that as time went on it became increasingly difficult to keep a correct classification of the various marks, with the result that many dual registrations occurred, causing considerable trouble. Then, again, with the increasing number of stock owners the demand for a published list of the brands registered became more and more manifest, but with such a number of miscellaneous characters the cost of issuing such a publication was almost prohibitive.

In this Act (1881) provision was also made for the registration of sheep earmarks. For this purpose the State was divided into fourteen districts, and the same mark, or combination of marks, could be registered in each district—in other words, by fourteen different owners. This system would have acted admirably provided an additional distinguishing mark for each district had been added. Such mark would at once point to the district in which such sheep were bred and indicate the registered owner, but this was not done, and following upon the rapid increase of sheep, and the movement of large numbers from one district to another with their subsequent dispersion throughout the State per medium of saleyards, conflict and difficulties naturally arose and the value of the registered mark, so far as protection was concerned, was materially nullified.

The outcome of this state of affairs resulted in the bringing in of new legislation embodying a definite system of brands and marks capable of being easily published, and one that would better safeguard the owner of each registered mark.

Thus the 1881 Act was repealed and the present Act of 1904 became law.

This Act provides that all horses and cattle (which includes asses, mules, and camels) shall be branded with a fire brand. If, however, an owner desires to use an earmark on cattle he may do so in addition to the firebrand, but it must be a registered mark allotted by the Registrar. The cattle earmark, however, is purely optional, whilst the firebrand is compulsory, and it is an offence against the Act for any owner or occupier of a holding to have in his possession or custody, or on his run, any unbranded stock over the age of eighteen months, and, in respect to sheep, over six months.

For sheep the Act provides that the brand shall consist of an ear-mark. Wool, fire, and other brands being optional, but if used must be registered. Any person imprinting on any animal a brand of which he is not the owner is offending against the Act and is liable to prosecution.

Horse and Cattle Brands

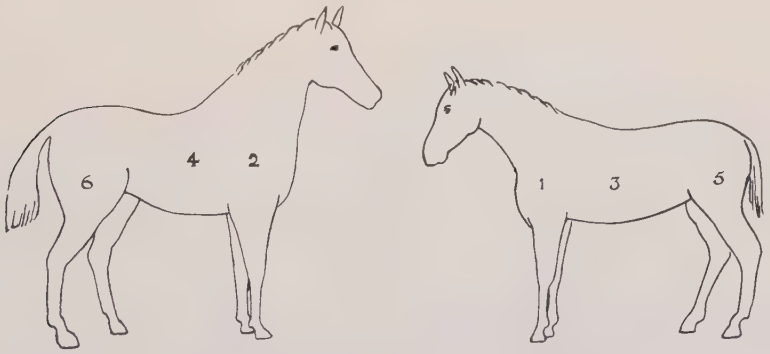
must consist of two letters and a numeral. The minimum size of the characters shall be one and a quarter inches in height. No conjoined letters are allowed; they must be in alignment and in accord with the diagram shown on the certificate of registration. The brand must be applied on the portion specified in the Seventh Schedule of the Act, which is as follows:—

Seventh Schedule.

Portion and Order of Brand on Horses

First portion—"Near shoulder."
Second portion—"Off shoulder."
Third portion—"Near ribs."
Fourth portion—"Off ribs."
Fifth portion—"Near quarter."
Sixth portion—"Off quarter."

The illustration hereunder shows the position and order of rotation for imprinting brands on horses in accordance with the Act:—



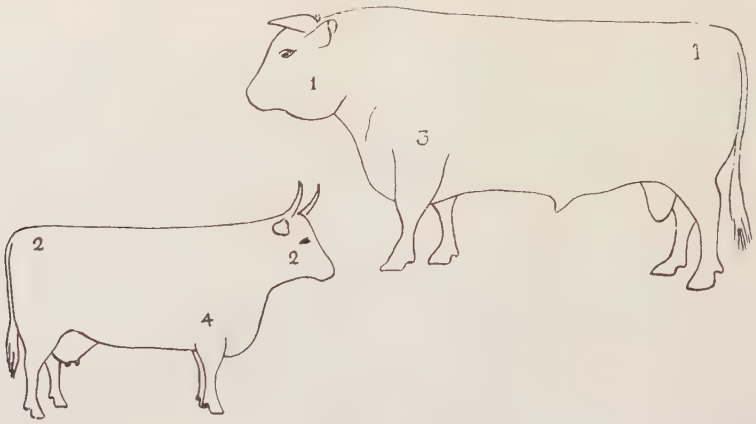
Position and rotation of Horse Brands.

Seventh Schedule.

Portion and Order of Brand on Cattle.

First portion—"Near rump" or "Near cheek."
Second portion—"Off rump" or "Off cheek."
Third portion—"Near shoulder."
Fourth portion—"Off shoulder."

The illustration below shows the positions in their order as indicated in the Seventh Schedule referred to above. It will be noted two *first* positions are shown, it being optional for the person first branding to place same either on the near "rump" or "cheek."



Order and position of Cattle Brands.

The *second* or any subsequent portion shall not be used unless the available space on the preceding portion has been used.

Section 26. *Rules of Branding.*

1. Brands for cattle and horses shall be imprinted on such cattle or horses in the following manner, namely:—

(a) Every brand shall be imprinted on the portion and in the consecutive order allotted and indicated in the Seventh Schedule.

(b) The person imprinting the first brand upon any horse or head of cattle shall brand upon the first portion.

(c) The next brand shall, where there is space sufficient for that purpose, be imprinted on the same portion as, and at a distance of not less than one and a-half inches nor more than two and a-half inches from and directly underneath the first brand; but where there is not space sufficient for a second brand on the said portion, then, but not otherwise, such brand shall be imprinted on the portion next in order to the said first-mentioned portion, and so on until all the portions are used in the consecutive order aforesaid.

(d) The available space on one portion shall be used before any brand is imprinted upon the next portion, but no more than two brands shall be on any one portion.

For cattle it is optional for the person imprinting the first brand on a beast to place same either on the near cheek or near rump. This proviso was made to enable those desirous of doing so to confine their markings to the least valuable portion of the skin, and thus preserve the hide intact, and by saving the more valuable portions from deterioration and disfigurement, thus enhancing its value.

It is further provided that the person first branding either horses or cattle may imprint a numeral or numerals—

(a) on the cheek to denote age; and

(b) on the neck for reference to any stud or herd book relating to such horses or cattle;

but for no other purpose and in no other position.

Numerous reports are made of illegal branding, and, upon investigation, it appears a number of stock owners are ignorant of the proper method of branding stock, and innocently brand their cattle on the milking side, thinking that to be the near side as prescribed by the Act, whereas the near side of cattle is the same as that of the horse, *i.e.*, the animal's left side.

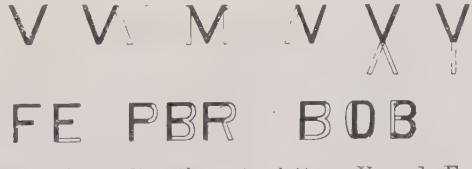
It is most important that the branding irons should conform in shape to the "printed" letters shown on each certificate. In the first series of brands registered, all upright letters were issued, such as A 1 A, but these letters and figures were unfortunately drawn in each certificate by hand, and no uniformity of character in any individual letter or figure was adopted, consequently that series of certificates show different shaped figures, etc., according to the varying conceptions of the issuer. The figure three, for instance, might have either a round or horizontal top, or a six or nine have either a straight or rounded back; the same thing applies to the letters. It was intended, however, that all such letters or figures should be of the ordinary block type as shown hereunder—

A B C D E F G H J K L M N O

P Q R S T U V W X Y Z

0 1 2 3 4 5 6 7 8 9

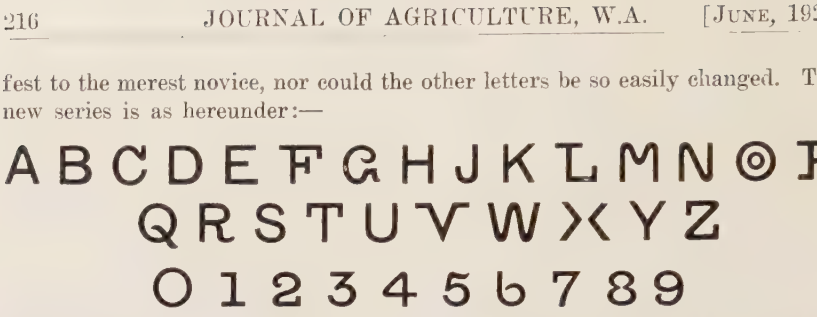
The disadvantage of this type of letter is the ease with which they can be readily altered or changed. This can be seen from the illustration hereunder of the letters V and F, to the right of which are shown some possible fakings, and most of the other letters of this series can be similarly affected.



Possible alterations to letters V and F.

Now, however, a new series of letters and figures has been entered upon. These letters differ in formation to the ordinary printed letters of the first series, in so far as they are designed with the object of preventing the alteration or "faking" of any brand without detection. The V and F of this series, it will be noticed, could not possibly be faked without such faking being mani-

fest to the merest novice, nor could the other letters be so easily changed. The new series is as hereunder:—



In this series the first letter is always shown on its side, such as—**◁1A, 1 A, ◁A1,** and the brand is stamped in printed letters on the certificate.

The value of branding in sequence is incalculable, for it can be thus seen at a glance who is the owner, and enable both the finder of any strange beast, or the poundkeeper, immediately to get in touch with the rightful owner.

SHEEP.

After much consideration it was decided definitely to adopt ear-marking of sheep in preference to various other methods employed in other parts. The reasons for this procedure are plain, *e.g.*, drafting.

The Act provides that males should be marked on the right ear and females on the left, thus in a race a glance at the ear-mark enables one easily to separate the sexes. Contrasted against this, if the firebranding method were adopted this would merely settle the question of ownership, and even so it would necessitate the handling of every animal. However, with the ear-marking system a stranger may be picked out at sight from a flock. Permanency of the mark for true ownership is also assured.

Several systems of ear-marking now in vogue were suggested for this State, and eventually a two-character mark was decided upon to be confined to the one ear and in such position as to eliminate any element of error which might be perpetrated by a careless operator, *e.g.*, two different characters placed one on the front and the other on the back of the ear. It matters little whether placed near or far from the tip, since the combination is not altered. In other systems this fact distinguishes two separate marks. If placed near the root it signifies one thing, and if near the tip quite a different mark. As ear-mark pliers are frequently placed in the hands of careless individuals, a system which provides so small a distinction and does not allow of human error soon leads to trouble.

In some States the same ear-marks were registered in various districts, thus necessitating the addition of another mark, known as a district mark, making three in all. Not only is this confusing on a small ear surface, but it also means time when dealing with large flocks. Our system consists of some fifty different characters, and these are combined in every possible way, but in no such way as to make duplication possible. This provides about 11,000 distinct marks. At any time when new marks are required the addition of new characters to the original number will greatly increase the number of combinations possible. Thus one may see that the constant addition of characters makes it possible to continue the two-figure combination indefinitely. Some of the systems considered showed markings on both ears, but from the foregoing description it is shown that the retention of one ear for registration purposes leaves the other open for age and cull marks, etc., which may be deemed necessary.

Unfortunately, in 1917, a departure was made from the original scheme of using only two characters, in that instead of drawing up fresh characters it was decided to divide the State into five districts and register existing marks in each district, but in order to denote the rightful breeder it was necessary to add a further character, *i.e.*, a separate district mark for each divison, making three characters in all. Consequently, in all registrations between the end of 1917 and 31st December, 1925, the certificates showed the three characters, *all of which must be used and continue to be used.*

Many people who registered during the above period are under the impression that because we are not now registering a district mark they also should discontinue its use, but all marks must be made according to the diagram shown on the certificate. In January, 1926, the two-character system was again brought into vogue and sufficient combinations of marks are available to meet the demand for a number of years to come.

The Act provides that sheep brands must consist of an ear-mark. The wool brand or firebrand, as mentioned before, are both optional.

An ear-mark shall be made on the near ear (left) for female sheep and on the off ear (right) for male sheep and not otherwise.

A wool brand shall be stamped with branding oil or such other suitable material as may be specified on the certificate of registration upon some part of the body also specified.

A firebrand shall be burnt on the face or horns.

The position of the respective characters forming the ear-mark are clearly shown on the diagram on the certificate, likewise the wool and firebrand and such shall be used only on such specified portions.

No earmarks on a sheep shall exceed ¾in. in length or ½in. in width or diameter.

It should be pointed out here that as most of the ear-marking is done on lambs, the use of pliers made to the maximum size is wholly undesirable. Most pliers offered for sale are of the maximum size, the result being that half of the lamb's ear is cut away. Pliers half the prescribed size are preferable. A better mark is made and the ear is not unduly mutilated.

All ear-marks are to be made by a punch or pliers only, and no ear or any part thereof shall be cut, sliced, or split by means of any other instrument than a punch or pliers used to make a registered ear-mark, or cull mark, or age mark.

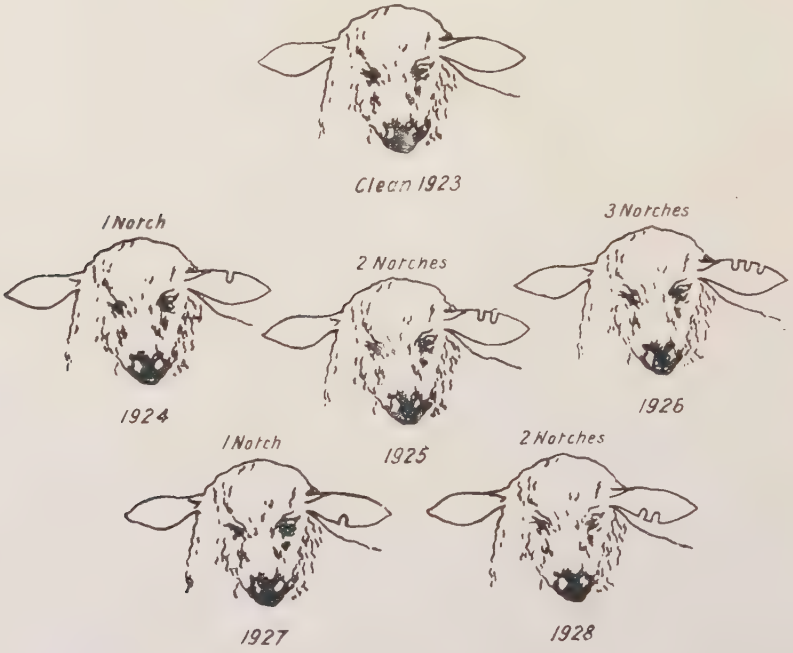
On no account must any mark be made on the ear of registration other than the registered earmark. Any person making other than the prescribed cull mark on the *off* ear of female sheep, or on the *near* ear of male sheep, or age mark, as prescribed, is guilty of an offence against the Act.

The prescribed cull mark for use throughout the State is a punch hole punched in centre of the opposite ear to that bearing the registered ear-mark.

Age Marking.—Age marking is not compulsory; breeders desiring to age-mark their sheep, however, must conform to the provisions of the Brands Act, which provides that in every sixth year after 1905 the off or near ear, as the case may be, of all sheep lambed during the year shall be left clean; for sheep lambed every sixth year after 1906 the age-mark shall consist of one notch on the front of the ear; for sheep lambed every sixth year after 1907 the age-mark shall consists of two notches on the front of the ear; for sheep lambed every sixth year after 1908 the age-mark shall consist of three

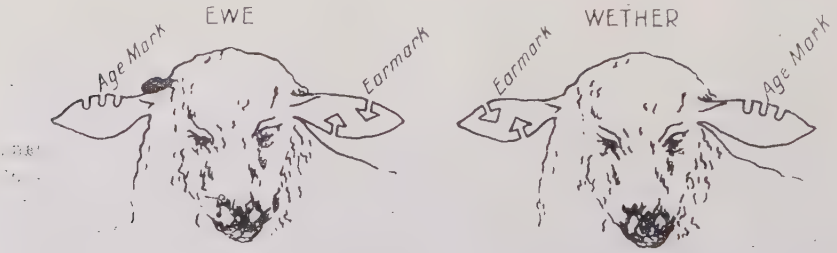
notches on the front of the ear; for sheep lambed every sixth year after 1909 the age-mark shall consist of one notch on the back of the ear; for sheep lambed every sixth year after 1910 the age-mark shall consist of two notches on the back of the ear.

The following illustration shows the age mark for the six-year cycle as provided by the Brands Act. The mark is drawn on the near ear or that which would be used for wethers (a male sheep); for ewes (a female sheep) the opposite or off ear would be marked.



Age marks for six year cycle as provided by the Brands Act Thus 1929 and every sixth year thereafter the ear must be left clean and the cycle repeated.

To show how this year's age mark would show on sheep already bearing the registered earmark, the illustration hereunder shows both male and female sheep correctly earmarked, and at the same time bearing the age mark for 1926 on the prescribed ear.



Sheep correctly earmarked, and agemarked for 1926.

Table showing years for Age-marks.

Clean	1911	1917	1923	1929	1935
One notch front	1912	1918	1924	1930	1936
Two notches front ..	1913	1919	1925	1931	1937
Three notches front ..	1914	1920	1926	1932	1938
One notch back ..	1915	1921	1927	1933	1939
Two notches back ..	1916	1922	1928	1934	1940

It is often noticed when examining ear-marks at sales that they are placed on the ear in a very haphazard way, the pliers either not having been held squarely or not having been placed sufficiently deep in the ear. Then again, some marks are put in with a knife, which is contrary to the Act.

Wool brands also are placed haphazard all over sheep. The yard is apparently entered and the brand placed on any available part of the animal. Marks are also used that are not registered, and the person so doing renders himself liable as an offender. In the past infringements of this nature have been looked over, but the time has now arrived when such practices must cease. Careless branding causes confusion, and it behoves every owner of stock, in his own interests, to see that marking is correctly done.

The most frequent contravention of the Act in marking sheep is the use of the bottle brand O. It is generally adopted as a means of quickly picking out stock selected for market or culling purposes, and is frequently placed on sheep already bearing the registered wool brand. This extra mark is added for the purpose stated, and not being the registered wool brand of the user, it is, of course, illegal.

A little thought on the owner's part would enable him to mark distinctly any sheep he wished to distinguish particularly by the application of his registered wool brand a second time, thus gaining the same objective while complying with legality.

The purchaser of stores usually only retains them until ready for market, and is content to dispense with re-marking them, but for the breeder of stud sheep it is necessary to have some system whereby he can classify the various grades of ewes or rams; but as the Act stands at present he cannot mark any animal with other than his registered mark. Recognising this difficulty, it is intended, whenever the Act is amended, to approach Parliament with the view of making provision for the use of the figures 1 to 9 for this purpose, to be used by any individual breeder as he may deem fit, either as a wool brand, firebrand, or ear-mark. Of course, a wool brand is not a permanent mark, whereas the firebrand and ear-mark are fixtures and will enable any breeder to mark permanently the grades of his flock, and by use of the single figure or combination, ample provision will be made to meet all purposes without the least possibility of conflicting with existing registrations. The ear-marking numbers, of course, would be placed on the opposite ear to that bearing the registered ear-mark, or more generally known as the Government ear, whilst the firebrand would be applied to the cheek, nose or horns.

Cattle Earmarks.—These are only registered in conjunction with the Horse and Cattle firebrand, the latter being the recognised brand under the Act and which is compulsory, whereas the earmark is purely optional, but when used must be registered. The same code of earmarks is used for cattle as are registered for sheep, every mark consisting of two characters or symbols

confined to one ear only, it being optional for the earmark to be registered for either the near ear or off ear.

It is advisable wherever possible to have all brands uniform for the one holding. A farmer in the early stages of his operations first registers a horse and cattle firebrand (2 letters and a numeral). Later, as his farm becomes improved sufficiently to carry sheep, an earmark is necessary for marking his lambs. He, of course, cannot place this earmark on any stores that he may purchase, as such sheep would in all probability be already earmarked; therefore, to enable him to distinguish them from his neighbours, who may also have purchased a pen at the same sale, a woolbrand becomes necessary, and it is just here where he should aim at keeping his brands uniform by applying for the same characters as his registered Horse and Cattle firebrand. Many, in fact, use the horse branding implement for this purpose. In quite a number of wool brands registered no uniformity was aimed at, the result being a multiplicity of brands are used on the one holding which, to say the least, is very confusing and fails to convey the knowledge of ownership that exists where uniformity is adopted.

The same applies to cattle earmarks, *i.e.*, the registered sheep earmark should be applied for cattle also when earmarking is deemed necessary.



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2—4

TESTS TO DETERMINE THE PRESENCE OF ARSENIC IN APPLES AFTER TREATMENT WITH ARSENICAL SPRAYS.

Geo. L. Sutton,
Director of Agriculture.

In the "West Australian" of 18th December, 1925, there appeared a London cable of the 16th idem stating: "After an informal Conference between representatives of the National Federation of Fruit Traders and the health officers of the Port of London, Westminster, and members of the medical staff of the Ministry for Health, Dr. A. W. J. MacFadden, said emphatically to-day that the Ministry for Health intended to pursue its investigations at the docks as far as possible, and on finding even the one-hundredth part of a grain of arsenic to a pound of apples it would continue its minute examination, and on discovering one-tenth of a grain in a pound it would probably condemn the entire cargo. It would not allow the re-export of the apples, but would order the cargo to be shipped back to the country of origin. He would order the condemnation of a consignment whenever the presence in the fruit of one-hundredth part of a grain of arsenic per lb. was brought to his notice."

To those familiar with orchard practice such a decision by the Medical Officer attached to the Ministry for Health implies that apples were being imported into Great Britain which had been sprayed or otherwise treated with arsenical preparations in a different manner than is customary in Australia, for unless this were so, an unreasonable and unwarranted scare was being created. In view of the millions of bushels of sprayed apples which have been eaten without injurious effect, it would indeed be surprising at the present time for anyone, much less a well-informed medical officer, to raise anything like a scare in connection with the possible dangers accruing from the residual remains of arsenical or other sprays. Many years ago, in the early days of spraying history, scares regarding the danger from eating American apples sprayed for Codlin Moth or Canker Worm were raised. Lodeman * records "that the bloom found on American apples consisted largely of the arsenic which had been applied to the trees to destroy insects, and that such apples were unfit for use. These reports have led to many chemical examinations of sprayed fruit, and only in rare cases has even a trace of arsenic been found. It is only when very late applications are made, such as are utterly useless, that any of the poison is found upon the fruit, and then the quantities are so minute that they could in no way cause injury to the consumer. But even though all the poison sprayed upon the apples in making necessary treatments should remain there undisturbed, a person would be obliged to eat at one meal eight or ten barrels of the fruit in order to consume enough arsenic to cause any injury."

When the practice of spraying was introduced into the orchards of the Commonwealth mainly with the object of combating the destructive Codlin Moth, such scares were quite common, and I can well remember the reply which Dr. Cobb, Vegetable Pathologist, Department of Agriculture, New South Wales, on one occasion gave to an orchardist who was frightened about

* The Spraying of Plants.

this matter: he said that to obtain sufficient arsenic to be harmful it would be necessary for the consumer to eat more than a bushel of apples at a sitting. Now, if this feat were achieved it is quite conceivable that the doctor attending the case would decide that the patient had suffered more from the apples than from the spray residue.

Professor Cook, of the Michigan Agricultural College, and a pioneer in the use of insecticides, adopted heroic measures to allay the fears of those who at first regarded the use of spray poisons to control insect pests as dangerous both to man and to live stock. After having had the drippings from the sprayed trees carefully analysed he found that the arsenic in the material collected was insufficient to be harmful to the farm live stock. He then fed similar material from other sprayed trees to a horse and sheep on two separate occasions, and each time without ill effects. He considered such experiments were crucial and settled the matter completely, for the analyses had shown there was no danger, and the experiments with the live stock had confirmed this. Even in the United States where these investigations were carried out it is recorded* that in 1891 the Board of Health of New York on one occasion seized considerable quantities of grapes which showed the presence of Bordeaux Mixture (a copper-lime spray) and threw them into the river. Subsequently the United States Department of Agriculture published a bulletin dealing with this question, and referring to the presence of copper on grapes sprayed with Bordeaux Mixture, the conclusion arrived at was: "Each 1,000 pounds of fruit would contain 17.5 to 35 grains of copper. On this basis an adult may eat from 300 to 500 pounds of sprayed grapes per day without fear of ill effects from the copper. This shows how ridiculously absurd are the statements that fruits properly sprayed with Bordeaux Mixture or any other copper compound are poisonous."

It is, therefore, obvious that fruit lovers may continue to enjoy fruit with pleasure and advantage to their health and without fear, even though the fruit should have been sprayed in the manner usual in this State. As far as apples affected with Codlin Moth are concerned, Western Australia is fortunate that, even during the past season, when there was a well distributed outbreak of Codlin Moth (now well in hand toward eradication), not one per cent. of our orchardists had any need to spray for the pest; and in any year when spraying is necessary in order to control the attacks of beetles, looper caterpillars, or other insect pests, it is done so early in the season that the small amount of arsenic which may possibly be left will have rather a tonic than injurious effect.

Fortunately the scare occurred in Great Britain prior to the commencement of the Australian apple export season, and steps were at once taken to confidently assure the buyers in Great Britain that as far as our matured export apples were concerned there was no need to fear the most rigid test which the health authorities in the export markets might require. Despite this assurance, which was cabled to the Agent General (Hon. H. P. Colebatch), it was found that the alarm which had been created in Great Britain, when the export of apples was about to commence, had not been allayed, and in consequence our export trade was likely to be detrimentally affected unless some definite official statement could be made regarding the quantity,

* The Spraying of Plants.

if any, of residual arsenical spray on the apples, then almost ready to be exported, and which had been treated with an arsenical preparation for the control of insect pests other than Codlin Moth.

After conferring with the Officer in Charge of the Fruit Industry (Mr. G. W. Wickens) and the Fruit Shippers' Committee, it was decided to have some apples analysed from three of the few orchards in which the fruit had had one or more sprayings for the purpose of controlling insect pests. Through the courtesy of Messrs. Craddock & Young, Mr. A. Flintoff, both of Bridgetown, and Mr. F. O. Nelson, of Balingup, the orchardists who supplied the apples for the test, and Mr. A. S. Lowe, Hon. Secretary of the Bridgetown Fruitgrowers' Association, who collected the samples and brought them to Perth, material for securing the necessary information was obtained in February and submitted the next day to the Government Mineralogist and Analyst (Dr. E. S. Simpson). The result of the anaylses as supplied by Dr. Simpson, together with the dates and details of the sprayings, are as hereunder:—

(1.) From the orchard of Messrs. Craddock & Young, Bridgetown, sprayed with—

Arsenate of Lead	12½ lbs.
Water	100 gallons.
Flour as spreader	6 ozs.

Variety of Apple.	No. of Sprayings.	Date of Spraying.	Arsenious Oxide.			
			Skin and Calyces.	Pulp.	Whole Apples.	Grains, per lb.
			%	%	%	
Cleopatra	1	End of October ...	0·000018	·000005	·000007	1/2000th.
Dunn's	2	End of October.				
Do.	...	2nd week November ...	0·000018	·000001	·000004	1/3600th.
Statesmen... ...	2	End of October.				
Do.	...	2nd week November ...	0·000029	·000002	·000007	1/2000th.
Rokewood ...	3	End of October.				
Do.	...	1st week November				
Do.	...	2nd week November ...	0·000030	faint trace	·000005	1/2900th.
Jonathan	2	Last week October.				
Do.	...	2nd week November ...	trace	*Nil*	trace	...

(2.) From the orchard of F. O. Nelson, Balingup, sprayed with—

Arsenate of Lead	8 lbs.
Water	100 gallons.

Variety of Apple.	No. of Sprayings.	Date of Spraying.	Arsenious Oxide.			
			Skin and Calyces.	Pulp.	Whole Apples.	Grains, per lb.
			%	%	%	
Cleopatra	1	End of October to 1st week November	trace	trace	trace	...
Commerce... ...	1	do. do.	0·000014	·000002	·000004	1/3600th.
Jonathan	1	do. do.	0·000015	·000002	·000004	1/3600th.

(3.) From the orchard of A. Flintoff, Bridgetown, sprayed with—

Arsenate of Lead	12½ lbs.
Water	100 gallons.
Flour as spreader	5 lbs.

Variety of Apple.	No. of Sprayings.	Date of Spraying.	Arsenious Oxide. Skin and Calyces.	Pulp.	Whole Apples.	Grains, per lb.
			%	%	%	
Rome Beauty ...	1	1st week November ...	0·000090	·000007	·000018	1/800th.
Jonathan	1	do.	0·00011	·000002	·000018	1/800th.
Cleopatra	1	do.	0·000061	·000001	·000009	1/1600th.

For Codlin Moth the quantity of Arsenate of Lead recommended is 5 lb. per 100 gallons of water. It will thus be seen that though the quantity used on the apples tested was much in excess of this, in two cases two and a half times as great, the amount of arsenic found on the apples when ready for shipment was negligible in all cases. The rainfall recorded at Bridgetown and Balingup subsequent to the first spraying, and until the fruit was gathered, as courteously supplied by the Government Meteorologist (Mr. E. B. Curlewis) in points (100 points = 1 inch) was—

	November.	December.	January.	February.
Bridgetown ..	74	134	Nil	41
Balingup ..	22	77	7	40

It will be seen that the residual amounts found on the apples, and which ranged from a mere trace to 1/800th of a grain, were obtained without excessive rain to wash off the spray. The largest residual amount, though only one-eighth of the minimum set by the British Ministry for Health, was, however, greatest in the case where the largest amount of flour had been used as a spreader; this quantity is believed to be excessive, and orchardists will be well advised to keep the amount of spreader at the minimum necessary for efficient results.

A further test was conducted with the object of determining the residual quantity of arsenic found on apples sprayed at an unusually late date in the very severe manner adopted for the purpose of eradicating the Codlin Moth. For this purpose the Officer in Charge of the Fruit Industry (Mr. G. W. Wickens) obtained specimens of apples from the orchard of Mr. L. Sharp, North Dandalup, which had been quarantined because of the presence of Codlin Moth. They were sprayed five times, the last spraying being on the third week in December. The strength of the spray was 6 lbs. of Arsenate of Lead in 100 gallons of water, with calcium caseinate as a spreader. In view of the severe treatment to which these apples had been subjected it was decided to have determinations made as to the quantity of residual arsenic found on apples which had been wiped as well as on apples as they were received from the orchard. The apples, as received, were submitted to the

Government Mineralogist and Analyst (Dr. Simpson). The results of the analyses as made up by him are:—

From orchard of L. Sharp, North Dandalup, sprayed with—

Arsenate of Lead .. .. 6 lbs.

Water .. .. 100 gallons.

Calcium Caseinate as spreader.

Variety of Apple.	Sprayings.	Unwiped Apples.				Wiped Apples.			
		Skin and Calyces.	Pulp.	Whole Apples.	Grains, per lb.	Skin and Calyces.	Pulp.	Whole Apples.	Grains, per lb.
		%	%	%		%	%	%	
Jonathan ...	Five (last spray third week in December)	0·00040	·000002	·000060	1/240th	0·00029	·000004	·000047	1/300th
Cleopatra ...	do. ...	0·00032	·000001	·000047	1/300th	0·00063	·000004	·000088	1/160th
Yates ...	do. ...	0·00060	·000011	·00010	1/140th	0·00011	·000002	·000018	1/800th
Dougherty's ...	do. ...	0·00087	·000003	·00013	1/110th	0·00020	·000004	·000029	1/500th

The rainfall recorded at North Dandalup was—

November.	December.	January.	February.
29	46	Nil	107

and here, as at Bridgetown and Balingup, the rainfall was light and therefore unlikely to materially assist in washing off the spray. From the result of the analyses it will be seen that despite a heavier spraying than is usual for Codlin Moth the largest quantity of arsenic found on any of the apples is considerably less than the amount permitted by the Imperial authorities, and though the apples from this orchard were not exported, they could have been without risk.

It will be noted that the "wiped" apples of the "Cleopatra" variety contained a larger percentage of arsenic than the "unwiped" ones. This is probably due to the calyces of the "wiped" apples being more open than the "unwiped" ones. In this connection Dr. Simpson states: "The samples were wiped with a dry cloth as would ordinarily be carried out for culinary purposes. The pit of the calyces would not be affected by wiping in this manner."

From the results of both trials it must be concluded that Western Australian apples, even when sprayed severely for Looper caterpillar, or drastically for Codlin Moth, can therefore be exported with the utmost confidence, and will satisfactorily pass the most rigid tests likely to be demanded by the Health authorities of Great Britain.

WHEAT YIELDS COMPETITION.

I. THOMAS, Superintendent Wheat Farms.

The second stage in the Wheat Yields Competition has been completed. The total number of competitors who had fully complied with the conditions of the Competition for the first year was 16 in No. 1 Zone, 14 in No. 2 Zone, and 1 in No. 3 Zone. Of these 5 withdrew in No. 1 Zone and 4 in No. 2 Zone. Mr. W. O. Sewell, the only competitor in No. 3 Zone generously withdrew and forfeited the advantages he had of being the only entrant so as to render it possible for further entries to be accepted for a new competition to extend over two years. Entries were invited, but the response was not great, only three being received including that of Mr. W. O. Sewell. This lack of interest in this zone is to be regretted, but it is pleasing to record the interest and the friendly but keen rivalry which exists amongst the competitors in this and in all zones. Now that the final stage is approaching this interest will be still greater.

The judging was carried out on the same basis as last year. The actual areas stripped were measured and the average yields were calculated from the actual quantities sold as disclosed by the sales dockets and those retained on hand for seed and farm requirements.

The judge in No. 1 Zone was Mr. H. Rudall, Field Officer, whose awards and report are as follows:—

WHEAT YIELD COMPETITION—1925.

No. 1 ZONE.

Competitor.	District.	Acreage.	Average Yield per acre.	Maximum points allocated for. Yield.	Freedom from Weeds.	Freedom from Disease.	Freedom from Admixture.	Evenness of Growth.	Total.
				35	25	15	15	10	100
			bus. lb.	Points awarded to competitors.					
Hughes Bros. ...	Minnivale ...	323	21 54	22	21	13	13	8	77
Hammond, J. D.	Kellerberrin ...	489	22 26	22	21	13	12	8	77
Lindsay, J. ...	Wyalkatchem	380	23 24	23	21	12	12	8	76
McCarthy, P. & Son	Eujinyn ...	755	16 3	16	20	13	13	7	69
Lethlean, J. ...	Bruce Rock...	366	14 6	14	20	13	13	7	67
Bradford, R. & L.	Ballidu ...	484	13 9	13	19	13	12	7	64
Spillman, J. W. ...	North Baandee	275	15 7	15	17	12	11	1	61
Spillman, D. J. ...	North Baandee	285	13 34	14	17	12	11	6	60
McLellan J. ...	Mt. Stirling ...	360	14 2	14	17	12	11	6	60
Lehmann, C. E. ...	Dukin ...	520	14 14	14	17	12	11	6	60
Ball, H.	Yelbeni ...	676	12 35	13	18	12	10	6	59
Dumsday, L. ...	Goomarin ...	310	6 23	6	17	13	12	6	54
Dunkley, G. ...	Yelbeni ...	Withdrawn.							
McManus Bros. ...	N. Bencubbin								
Pollock, R. ...	Belka ...								
Bell Bros. ...	Dalwallinu ...								

Messrs. Hughes Brothers and Mr. J. Deane Hammond tie for first honours in the second year of this competition. Mr. J. Lindsay secured second place with one point less, but in the aggregate for the two years of the competition this competitor has an advantage of two points, and is therefore still leading in this Zone for the Cup.

Messrs. Hughes Brothers' farm, "Strathmore," is situated 2½ miles from Minnivale, and comprises 1,543 acres, 1,500 of which are cleared; 480 acres were cropped with wheat and oats, 350 acres being fallowed. The general system of cropping is fallow, crop, pasture. The fallowed land was ploughed with Mouldboard ploughs about four inches deep, starting at the beginning of June, 1924. In the spring it was cultivated with a Sundercut and, after any summer rainfall, the land was harrowed or lightly cultivated again. The Springtyne preceded the drill, and the harrows followed after drilling.

The seed used was graded and pickled by dry method—carbonate of copper.

The varieties used were "Nabawa," "Gresley," and "Sailor's Fortune," sown at the rate of 45 lbs. with 112 lbs. of super. to the acre. The work on the farm is carried out by means of a tractor and eight horses. Seven to eight hundred sheep are pastured on the property, and only when absolutely necessary are any of the wheat paddocks fed off.

Mr. J. Deane Hammond's property, "Cuttening," 7½ miles from Kellerberrin, comprises 6,000 acres, of which 4,000 are cleared. The area cropped during the 1925 season was 1,590 acres, 1,065 acres being under wheat and 523 under oats. The whole cropping area was under fallow. The general system of cropping is two years for wheat and three years for oats. The fallow was ploughed from June to August 1924, with four-furrow Mouldboard to a depth of four to five inches. Cultivated three times before summer, if weedy disced before seeding and harrowed after drilling. The seed used was graded and pickled by dry method—carbonate of copper.

The varieties used were "Nabawa," "Merredin," "Gluyas Early," and "Canberra," sown from April to June at the rate of 45 to 60 lbs. seed and 112 lbs. of super. for grain to 156 lbs. for hay.

The work is carried out by means of a tractor and four seven-horse teams. A large portion of this competitor's crop is cut for hay, including the best paddocks.

About 2,500 sheep are pastured and practically no feeding off is done.

Mr. Lindsay's farm is situated six miles from Wyalkatchem. His holding comprises 1,320 acres, of which about 1,300 acres are cleared. The wheat crops are usually grown only on fallowed land, which is ploughed early and well worked. The seed wheat is graded, and is pickled according to the dry method with carbonate of copper. This year his area stripped for grain totalled 380 acres, from which he obtained the highest average per acre in this Zone, namely 23 bushels 24 lbs., and with the unusually scanty rainfall of only 727 points during the growing period. This result must be ascribed to the excellence of the methods adopted.

The holding is worked mainly on the three years' system. It is fenced with a rabbit and dog-proof netting fence, and carries a fair number of ewes and lambs, for which the oat pasture is grown. The favourite varieties are "Nabawa" and "Gluyas Early." The cultural work on the farm is carried out by means of a Case tractor and several horse teams.

In Zones 2 and 3 the judging was done by myself, and the awards in these zones are as hereunder:—

No. 2 ZONE.

Competitor.	District.	Acreage.	Average Yield per acre.	Maximum points allocated for. Yield. 35	Freedom from Weeds. 25	Freedom from Disease 15	Freedom from Admixture. 15	Evenness of Growth. 10	Total. 100
			bus. lb.	Points awarded to Competitors.					
Richards, T. ...	South Caroling	199	26 56	27	21	14	13	9	84
Hebiton & Sons ...	Three Springs	360	23 49	24	20	13	13	8	78
Morrell Bros. ...	Greenough ...	252	22 25	22	21	13	14	7	77
Elder, A.	Moulyinning...	175	21 35	22	20	13	13	8	76
Ackland, R. B. ...	Wongan Hills	295	20 40	21	20	13	14	8	76
Carter & Sons ...	Three Springs	263	22 22	22	20	12	13	7	74
Spencer & Sons ...	Wongan Hills	261	20 53	21	20	13	12	8	74
Mott, C.	Moulyinning...	223	21 8	21	19	13	12	8	73
Dall, S. C. ...	Quairading ...	465	19 59	20	20	13	12	8	73
Hayward, A. L. ...	Dindiloa ...	330	14 59	15	21	12	14	8	70
Keays, P. ...	Corrigin ...	Withdrawn.							
Bowen, T. ...	Wongan Hills								
Gottsch Bros. ...	Dudinin ...								
Nicholls, Robt. ...	Kondinin ...								

The total area of the winner's holding in this Zone (Mr. T. Richards, of South Caroling) is 869 acres, and except for the homestead and other areas reserved for shade and shelter, amounting to 21 acres, the whole is cleared. A four years' rotation is followed, namely, fallow, wheat, oats, pasture. The whole of the wheat crop is planted on fallowed land.

The area stripped for wheat, 199 acres, had been prepared by being ploughed four inches deep with Mouldboard plough during the months of June and July the previous year, and subsequently cultivated with a Springtyne implement towards the end of September and early October, after rain in February, and again after rain in March. It received a final cultivation at seeding time, being planted with a combined cultivating drill. In addition to this cultivation a flock of sheep of approximately 600 was depastured on the fallow to assist in destroying weed growth.

The seeding commenced in the second week and was completed by the end of May. The seed, which had been recleaned and treated with bluestone for the prevention of Ball Smut, was sown at the rate of 50 lbs. per acre. The midseason varieties "Nabawa" and "Gluyas Late" are favoured.

Superphosphate was applied at the rate of 112 lbs. per acre.

The whole of the area stripped was well grown and had a very attractive appearance, which was slightly affected by a sprinkling of wild oats. The evenness on the whole reflected great credit on this competitor, and indicates that the operations connected with its production were thoroughly carried out.

The second prize winners (Messrs. Hebiton & Sons) had two blocks situated several miles apart, but owing to the condition of the competition it is necessary for them to be treated as one, even though they were several miles apart. Of the 360 acres stripped 310 were fallowed and the balance new land.

The farm, as circumstances permit, is being gradually worked into a three years' rotation, namely, fallow, crop, pasture.

The varieties grown were "Nabawa," Gluyas Early," "Merredin," "Comeback," "Carrabin," "Federation," and "Gresley," the three former being the main varieties.

The seed was graded and treated with carbonate of copper (the dry method) for the prevention of smut. It was sown at the rate of 60 lbs. per acre with 112 lbs. superphosphate on all land, other than that cropped for the first time. This received 56 lbs. only.

A trace of ball and loose smut was noticed. The field of 51 acres of "Federation" was badly affected in large patches with red rust, which would reduce the yield considerably.

In No. 3 Zone the awards are as follow:—

No. 3 Zone.

Competitor.	District.	Acreage.	Average Yield per acre.	Maximum points allocated for. Yield.	Freedom from Weeds.	Freedom from Disease	Freedom from Admixture.	Evenness of Growth.	Total.
				35	25	15	15	10	100
			bus. lb.	Points awarded to Competitors.					
Sewell, W. O. ...	Pingelly ...	291	19 48	20	19	12	12	8	71
Clifford, M. ...	Gillimanning...	276	12 18	12	19	12	13	6	62
Taylor, B. ...	Kulyalling ...	207	13 23	13	16	13	12	7	61

Mr. W. O. Sewell, the winner in this Zone, stripped 291 acres of wheat, all of which was planted on fallowed land. The land had been prepared by ploughing with a Mouldboard plough four or five inches deep during July and August of the previous year. It was cultivated with a Springtyne cultivator in spring, and planted with a hoe drill commencing the third week in April.

The seed, which had been graded but not treated for the prevention of smut, was sown at the rate of 50 lbs. per acre with superphosphate at 90 lbs. per acre.

A little bunt and rust were noticed.

The crop was also a little uneven in height and stooling, but the heads were well filled.

The second prize winner, Mr. M. Clifford, had a stripping area of 276 acres. The land on which the crop was grown was a mixture of York and White Gum, Wattle, and Jam. It had been ploughed three to five inches deep with a Mouldboard plough during July and August of the previous year, and cultivated during spring and autumn and again prior to seeding. The variety sown was "Federation," with the exception of a small area of Baroota Wonder. The seed which had been graded and treated with bluestone for the prevention of smut was sown at the rate of 75 lbs. per acre during May and early June. Superphosphate was applied at the rate of 140 lbs. per acre. A little rust and bunt were noticed.

The general belief amongst the competitors in all zones, and these may be considered the leading farmers of the State, is that it is more profitable to rely on good farming methods rather than upon good seasons. This view is supported by the yields which have been obtained this season. In Zone 2

they reached almost 27 bushels and in Zone 1 exceeded 23 bushels. Though generally the yields are not up to last year's standards they are excellent and particularly creditable when it is remembered that an unusual dry spell of at least six weeks was experienced during the most critical period in the growth of the wheat crop. This dry period commenced during the last week in July and did not break until the second week in September.

The recorded rainfall for the past year as it applied to the different competitors is hereunder:—

RAINFALL.

No. 1 ZONE.

Competitor.	District.	Jan.	Feb.	March.	April.	Growing Period. May.	June.	July.	Aug.	Sept.	Oct.	Total Growing Period.	Nov.	Dec.	Yearly Total.
Hughes Bros. ...	Minnivale ...	260	130	124	17	126	258	189	9	150	39	771	25	68	1,395
Hammond, J. D. ...	Kellerberrin ...	282	152	71	10	148	253	178	22	128	60	789	20	...	1,324
Lindsay, J. ...	Wyalkatchem	260	130	124	17	126	258	189	9	150	39	771	25	68	1,395
McCarthy, P., & Son	Eujinyn	213	110	39	39	147	267	164	22	128	67	795	37	76	1,309
Lethlean, J. ...	Bruce Rock														
Bradford, R. & L.	Ballidu ...	118	100	43	6	181	302	277	33	226	56	1,075	26	24	1,392
Spillman, J. W. ...	Nth. Baandee	282	152	71	10	148	253	178	22	128	60	789	20	...	1,324
Spillman, D. J. ...	Do.														
McLellan, J. ...	Mt. Stirling	260	130	124	17	126	258	189	9	150	39	771	25	68	1,395
Lehmann C. E. ...	Dukin ...														
Ball, H., ...	Yelbeni ...														

No. 2 ZONE.

Richards, T. ...	South Caroling	221	173	82	38	164	194	185	36	148	74	801	15	10	1,340
Morrell Bros. ...	Greenough ...	65	28	65	...	261	777	300	140	208	53	1,739	11	51	1,959
Hebiton & Sons ...	Three Springs	387	9	132	2	174	450	206	44	208	35	1,117	17	176	1,857
Elder, A.	Moulyinning ...	50	115	154	69	144	235	136	35	88	163	801	...	209	1,398
Ackland, R. B. ...	Wongan Hills	118	100	43	6	181	30	277	33	226	56	1,075	26	24	1,392
Carter & Son ...	Three Springs	387	9	132	2	174	450	206	44	208	35	1,117	17	176	1,857
Spencer & Son ...	Wongan Hills	118	100	43	6	181	302	277	33	226	56	1,075	26	24	1,392
Mott, C.	Moulyinning ...	50	115	154	69	144	235	136	35	88	163	801	...	209	1,398
Dall, S. C. ...	Quairading ...	221	173	82	38	164	194	185	36	148	74	801	15	10	1,340
Hayward, A. L. ...	Dindiloa ...	16	17	41	...	242	648	335	142	191	73	1,631	25	75	1,805

No. 3 ZONE.

Sewell, W. O. ...	Pingelly ...	83	56	69	38	160	221	281	57	165	77	961	...	72	1,279
Clifford, M. ...	Gillimanning ...	80	139	114	45	153	266	241	36	148	104	948	...	131	1,457
Taylor, B. ...	Kulyalling ...	83	56	69	38	160	221	281	57	165	77	961	...	72	1,279

Because of the greater reliance now placed on good methods a determined effort is made by all competitors to plant as much as possible of the area seeded on fallowed land. There is more similarity in the methods of fallowing than in any other of the operations connected with the production of the crop. The first operation of breaking the land is done during the months of June, July and August and the general aim is to commence and complete this work as early as possible. The type of plough varies, but the most popular is the mouldboard. The ploughed land is invariably cultivated twice in the spring and before seeding. Some competitors also cultivate after rain during summer to destroy weeds and maintain a mulch. The type of cultivator varies according to the condition of the land at the time. The Springtyne cultivator is generally used, but occasionally the disc type is operated mostly when the land has become too hard for the Springtyne to give satisfactory results. Some farmers utilise the heavy harrows for a light cultivation to form a mulch after light rains which have been sufficiently heavy to form a crust on the surface.

No hard and fast rule can be laid down as to what type of implement is to be used. This is—as must always be the case—left to the expert judgment of the competitor, whether it be a springtyne, disc or harrow; all are good in their place, but discretion must be exercised. The choice of the implement having been made, it must be skilfully and properly operated.

The rate of seeding varied from 45 to 60 lbs., and the rate of superphosphate 70lbs. to 112lbs. per acre in Zone 1. In Zone 2 the rate of seeding varied from 45lbs. to 81lbs., but most of the competitors sowed 60lbs. with superphosphate ranging from 56lbs. to 150lbs., the majority applying about 100lbs. In Zone 3 seed was used at the rates of 50lbs., 60lbs. and 75lbs. Two competitors applied superphosphate at 90lbs., the other using applications up to 140lbs.

The month of May may be considered as the favourite time for planting, and it is preferred that when possible the planting takes place after rain.

The results of the two years' competition in Zones 1 and 2 are tabulated and shown hereunder:—

WHEAT YIELD COMPETITION.

RESULTS, 1924-1925.

No. 1 ZONE.

Competitor.	District.	Acreage, 1924.	Yield, 1924.	Total Points awarded 1924.	Acreage, 1925.	Yield, 1925. awarded,	Total Points 1925.	Aggregate Points, 1924-25.
			bus. lbs.			bus. lbs.		
Lindsay, J. ...	Wyalkatchem	390	26 35	81	380	23 24	76	157
Hughes Bros. ...	Minnivale ...	347	24 15	78	323	21 54	77	155
Hammond, J. D.	Kellerberrin ...	567	23 9	77	489	22 26	77	154
McCarthy, P., & Son	Eujinyn ...	765	23 49	76	755	16 3	69	145
Lethlean, J. ...	Bruce Rock ...	390	24 3	77	366	14 6	67	144
Spillman, J. W. ...	North Baandee	510	18 13	65	275	15 7	61	126
Ball, H.	Yelbeni ...	600	19 11	66	676	12 35	59	125
Spillman, D. J. ...	North Baandee	410	17 24	64	285	13 34	60	124
McLellan, J. ...	Mt. Stirling ...	360	14 47	62	360	14 2	60	122
Bradford, R. & L.	Ballidu ...	395	10 25	58	484	13 9	64	122
Lehmann, C. E.	Dukin ...	600	13 2	61	520	14 14	60	121
				No. 2 ZONE.				
Richards, T. ...	South Caroling	195	22 0	74	199	26 56	84	158
Morrell Bros. ...	Greenough ...	215	23 7	76	252	22 25	77	153
Ackland, R. B. ...	Wongan Hills	352	20 41	75	295	20 40	76	151
Dall, S. C. ...	Quairading ...	286	21 6	76	465	19 59	73	149
Carter & Son ...	Three Springs	241	25 35	75	263	22 22	74	149
Elder, A. ...	Moulyinning ...	361	21 16	72	175	21 35	76	148
Spencer & Son ...	Wongan Hills	264	22 53	72	261	20 53	74	146
Mott, C. ...	Moulyinning ...	178	20 37	72	223	21 8	73	145
Hebiton & Sons...	Three Springs	218	*14 30	67	360	23 49	78	145
Hayward, A. L. ...	Dindiloa ...	230	15 7	73	330	14 59	70	143

* A considerable area was destroyed by hailstorm for which no allowance could be made. This reduced the total yield and consequently the yield per acre.

The good yields obtained by the competitors in this competition are having an inspiring influence upon the yields of the general body of farmers throughout the Wheat Belt, and their effect must increase.

KAFFIR CORN.

grown on Mr. R. A. Dusting's poultry farm at Osborne Park from seed supplied by the Department of Agriculture.

This grain sorghum is equal to maize grain in feeding qualities.

Poultry farmers having land available would be well advised to put in small experimental plots under Kaffir Corn or Milo for use as seed for the following season.

Grain sorghums will grow successfully on poorer land and with less moisture than maize.

A limited quantity of seed is available for distribution in small parcels at the Department of Agriculture, Perth, on application.



Kaffir Corn.

DAIRYING.

Milk products have come down through all the ages as the essential food of the human family, yet dairying demanded a hazardous undertaking until Wisconsin inventions transferred it into a scientific and business-like industry.—"New Facts" Bulletin 4585.

FRUIT EXPORT FROM WESTERN AUSTRALIA FOR SEASON 1926.

Geo. W. Wickens,
Officer in Charge Fruit Industry.

The export season of 1926 has been noted for alternating high hopes and keen disappointments. At the time when the fruit was setting many growers expressed the opinion that their apple trees had blossomed poorly and set badly, and, as a consequence, they would only have a very small quantity for export. As the Spring and early Summer progressed, it became evident they had under-estimated the crop (which, by the way, is a very common occurrence indeed), and the certainty of a good, if not a heavy, crop, became assured. This, with the enquiries from agents as to quantities for sale, led to high hopes of a most successful season.

Then one of the most important apple-growing centres in the State—Mount Barker—was visited by hail storms; not one, but several, and many growers saw their chances of success fall to zero. A little later, however, buying for the overseas markets became keen and prices rose until they ranged from 7s. 9d. to 9s. per case for mid-season varieties—"Jonathan," "Dunns," and "Cleopatra"—standard quality at grower's sidings, and once more hopes ran high, for it was thought with agents operating for English buyers at the prices named, those in a position to know must anticipate a firm market, and growers who shipped on consignment looked confidently forward to good prices in England.

Then came the strike in Great Britain—the unkindest cut of all, and once more disappointment was the order of the day. At the time of writing (third week in May) the strike has ended, but the outlook for payable prices is not too rosy, though growers are still hoping that the later consignments may, with the return to normal conditions in England, meet with a brisker demand.

I append hereunder full particulars of export from 1st January to 14th May, 1926, one return showing quantities sent to destinations other than Java, Singapore, etc., and the other showing quantities sent to those places.

It will be noted that 52 boats loaded fruit for overseas markets, and that 326,751 cases were sent away.

Statement No. 1.

EXPORT of FRESH FRUIT from Western Australia to Overseas Markets (Excluding Java, Singapore, Etc., from 1st January to 14th May, 1926.

Boat.	Date of Departure.	Destination.	Apples.	Grapes.	Pears.	Plums.	Nectarines.	Peaches.	Passion Fruit.	Quinces.	Total.
	1926.		bushels.	¾-bushel.	bushels.	¾-bushel.	¾-bushel.	¾-bushel.	¾-bushel.	bushels.	
"Jervis Bay"	Jan. 16	London	...	...	53	43	46	...	...	...	
"Mooltan"	Jan. 25	Colombo	...	48	...	...	...	...	...	...	
"Mongolia"	Feb. 8	Colombo	...	100	...	...	...	...	...	...	
"Hobson's Bay"	Feb. 10	London	30	1,317	1,740	75	...	8	7	...	
		Colombo	100	186	...	...	...	...	...	...	
		Port Said	372	...	...	...	...	...	...	...	
"Orvieto"	Feb. 16	Colombo	330	306	...	...	...	...	...	...	
"Maloja"	Feb. 22	Colombo	435	200	...	...	...	...	...	...	
		Bombay	300	...	...	...	...	...	...	...	
"Clan Malcolm"	Feb. 24	Port Said	105	...	...	...	...	...	...	...	
"Northumberland" ...	Feb. 25	Port Said	1,221	...	...	...	...	...	...	...	
"Larg's Bay"	Feb. 25	Colombo	295	307	...	...	...	...	...	...	
		Port Said	300	...	...	...	...	...	...	...	
		Beyrouth	300	...	...	...	...	...	...	...	
		Hull	1,745	226	...	...	...	...	...	...	
		London	7,213	1,991	327	36	...	11	11	...	
"Villa Ada"	Mar. 3	Colombo	150	...	...	...	...	...	...	...	
"Euripides"...	Mar. 4	Liverpool	2,664	...	...	...	...	...	...	...	Albany.
	"	London	7,315	...	1,740	...	...	...	...	...	
"Euripides"	Mar. 6	Liverpool	2,292	195	33	...	...	...	...	...	Fremantle.
		London	7,818	965	475	...	...	...	...	...	
"Port Caroline"	Mar. 6	Hamburg	11,905	...	449	...	...	...	...	...	Albany.
"Port Caroline"	Mar. 9	Hamburg	16,615	216	277	...	...	...	...	...	Fremantle
"Cathay"	Mar. 8	Colombo	107	230	...	...	...	...	...	...	
		London	4,264	157	...	...	...	...	...	...	
"Berwickshire"	Mar. 10	Manchester	4,011	32	110	...	...	...	3	...	
		London	4,778	100	80	4	...	...	2	...	
		Port Said	1,950	70	...	...	...	...	...	...	
"Otranto"	Mar. 15	Colombo	990	830	...	...	...	...	...	...	
		London	4,961	1,708	...	...	...	...	...	...	
"Naldera"	Mar. 22	London	2,556	216	...	...	...	...	...	...	
"Port Kembla"	Mar. 22	Hull	973	...	...	...	...	...	...	...	
"Baufshire"...	Mar. 22	Liverpool	367	...	...	...	...	...	...	...	
		Port Said	1,279	...	...	...	...	...	...	...	
"Bendigo"	Mar. 23	London	22,581	...	2,413	...	...	...	...	...	
"Port Brisbane"	Mar. 25	Hull	13,816	...	1,374	...	...	...	...	...	

"Westfalen"	Mar. 27	Bremen	623	...	...	...	...	...	...	...			
"Esperance Bay"	Mar. 26	Colombo	413	896	...	...	...	...	...	...			
		Bombay	200	...	...	...	...	...	...	...			
		Port Said	462	...	...	...	...	...	...	...			
		Hull	5,720	352	324	...	...	...	...	...			
		London	11,779	2,354	3,074	...	...	...	...	...			
"Osterley"	Mar. 29	Colombo	410	396	...	...	...	...	...	...			
		Bombay	200	...	...	...	...	...	...	...			
		London	50	958	...	...	...	...	...	...			
"Otorama"	Mar. 30	London	15,814	...	...	...	...	...	...	...			
"Ballarat"	April 1	London	17,748	2,078	3,092	...	...	...	...	26			
"Comorin"	April 5	Colombo	296	551	...	...	...	...	...	...			
		London	4,467	690	15	...	...	...	...	...			
"Clan McKellar"	April 10	Port Said	305	...	...	...	...	...	...	...			
"Ormonde"	April 12	London	620	788	...	...	...	...	...	...			
		Colombo	878	614	...	...	...	...	...	...			
"Clan McTaggart" ...	April 17	Port Said	302	...	...	...	...	...	...	...			
"Sophocles"	April 18	London	6,951	643	756	...	...	...	...	...			
		Liverpool	4,016	334	161	...	...	...	...	...			
"Narkunda"	April 19	Colombo	189	141	...	...	...	...	...	...			
		London	3,299	294	...	...	...	...	...	...			
"Moreton Bay	April 22	London	7,412	997	771	...	...	...	...	...			
		Colombo	764	431	...	...	...	...	...	...			
		Hull	2,935	167	216	...	...	...	...	...			
"Balranald"	April 20	London	12,651	...	2,029	...	...	...	...	...			
"Fordsdale"	April 24	London	17,759	...	571	...	...	...	...	...	Albany.		
		Pt. Sudan	36	...	...	...	...	...	...	...			
"Oronsay"	April 26	London	2,566	572	...	...	...	...	...	...			
		Colombo	265	415	...	...	...	...	...	...			
"Fordsdale"	April 28	Alexandria	220	...	...	...	...	...	...	...	Fremantle.		
		Port Said	300	...	...	...	...	...	...	...			
"Wittell"	May 3	Hamburg	7,549	...	50	...	...	...	...	...			
"Orama"	May 10	Colombo	616	685	...	...	...	...	...	...			
"Ferndale"	May 14	Port Said	1,300	...	...	...	...	...	...	...			
		Hull	3,584	...	149	...	...	...	...	...			
Totals		... ...	256,837	23,756	20,279	158	46	19	23	26	301,144		

Statement No. 2.

EXPORT of FRESH FRUIT from Western Australia to Northern Markets—Java, Singapore, Etc., from 1st January to 14th May, 1926.

Boat.	Date of Departure.	Destination.	Apples.	Grapes.	Pears.	Plums.	Nectarines.	Oranges.	Peaches.	Passion Fruit.	Apricots.	Tomatoes.	Lemons.	Quinces.	Total.
	1926.		bushels.	¾-bushel.	bushels.	¾-bushel	¾-bushel.		¾-bushel.	¼-bushel					
"Centaur"	Jan. 7	Samarang ...	...	20	...	...	...	...	...	...	...	...	...	...	
		Singapore ...	...	...	...	1⅘	1⅓	50	20	...	1⅓	20	...	...	
"Ma Latian" ...	Jan. 20	Batavia ...	...	...	...	21	...	...	...	...	...	...	...	...	
"Kangaroo"	Jan. 26	Singapore ...	...	300	67	15	20	1½	1	...	...	...	10¾	...	
		Sourabaya ...	304	170	12½	9	...	...	...	...	...	...	...	...	
		Batavia ...	...	32	47½	32	...	10	...	...	...	...	5	...	
"Minderoo"	Jan. 29	Singapore ...	...	193	30	13	...	...	13	...	...	...	...	...	
		Batavia ...	...	10	22½	7	...	...	...	...	...	...	...	...	
"Gorgon"	Feb. 19	Singapore ...	120	6	...	...	...	...	...	...	...	...	...	...	
"City of Palermo" ...	Feb. 22	Songapore ...	632	571	...	...	...	...	...	...	...	...	...	...	
		Sourabaya ...	1,315	275	...	...	...	...	...	...	...	...	...	...	
		Padang ...	20	10	...	...	...	...	...	...	...	...	...	...	
		Samarang ...	75	32	...	...	...	...	...	...	...	...	...	...	
		Batavia ...	312	140	...	...	...	...	...	...	...	...	...	...	
"Kangaroo"	Mar. 8	Singapore ...	1,245	1,517	82	...	...	...	112	...	...	1	...	...	
		Sourabaya ...	755	651	55	...	...	...	40	...	...	...	...	...	
		Batavia ...	304	144	100½	...	...	...	40	...	...	...	...	...	
		Penang ...	1	...	...	...	...	...	...	...	...	...	...	...	
"Centaur"	Mar... 7	Singapore ...	1,257	515	...	...	...	...	...	...	...	...	...	...	
"City of Eastbourne"	Mar. 12	Mauritius ...	50	25	...	...	...	...	...	...	...	...	...	...	
"Merton Hall" ...	Mar. 18	Singapore ...	1,152	380	40	...	...	...	...	...	...	...	...	...	
		Samarang ...	25	20	...	...	...	...	...	...	...	...	...	4½	
		Batavia ...	311	175	50	...	...	...	...	...	...	...	...	...	
		Sourabaya ...	1,024	65	20	...	...	...	...	...	...	...	...	...	
"Gascoyne"	Mar. 25	Singapore ...	1,026	600	20	...	...	...	...	...	...	...	...	...	
		Sourabaya ...	169	89	...	...	...	...	...	...	...	...	...	...	
		Batavia ...	87	50	30	...	...	...	...	...	...	...	...	...	
"Minderoo"	April 20	Singapore ...	616	375	...	...	...	...	...	...	...	...	...	...	
		Sourabaya ...	...	25	...	...	...	...	...	...	...	...	...	...	
"City of Palermo" ...	April 29	Singapore ...	2,156	825	64	...	...	...	...	...	...	...	50	20	
		Sourabaya ...	1,731	625	7½	...	...	...	...	...	...	...	...	...	
		Samarang ...	35	...	...	...	...	...	...	...	...	...	...	...	
		Batavia ...	530	103	57½	...	...	...	...	...	...	...	4	...	
"Gorgon"	May 5	Batavia ...	191	...	14	...	...	...	...	...	...	...	...	...	
		Singapore ...	978	...	...	...	...	...	...	...	...	...	...	...	
Total ...	...	... ...	16,421	7,943	720	98⅗	21⅓	61½	226	...	1⅓	21	69¾	24½	25,607¾

THE AUSTRALIAN MERINO HAS NOT DETERIORATED.

By GEO. L. SUTTON,
Director of Agriculture.

In a statement recently published in the Australian Press the Chairman of the Victorian and South Australian Wool Buyers' Association (Mr. F. R. Bennett) drew attention to the difficulty which wool buyers now had in obtaining adequate supplies of fine wool, and to the unwarranted presence of rough, harsh fleeces amongst fleeces of a finer class.

The criticism was undoubtedly made with the commendable object of effecting what the author regarded as desirable improvements. Unfortunately, however, in calling attention to the improvements considered necessary, he has alleged that the quality of the Australian clip has deteriorated; that the classing and packing are less efficient than formerly; and further, has questioned the methods, the skill, and ability of our present-day sheep breeders. Such allegations as they affect Western Australia or Australia are believed to rest upon an entirely unsound foundation, and because of the official position held by Mr. Bennett, these may cause entirely wrong impressions to be formed by those outside Australia and unacquainted with Australian conditions. They cannot, therefore, be allowed to pass unchallenged.

In the "Australasian" of May 1st, the allegations have already been challenged by Senator Guthrie, and very effectively dealt with by him.

In connection with the alleged deterioration of the clip he very forcibly points out that: "Though there have been many practical inducements to produce the more shafty, higher-yielding, stronger quality wool, as against the fine-fibred, lighter-cutting variety, there is an ingrained preference among Australian sheep men for fine wool, and the statistics prove that, instead of the clip of to-day being coarser than it was 10 or 15 years ago, as stated by Mr. Bennett, the reverse is the case. For instance, the Australian clip of 1914-15 was classified as 76.5 per cent. Merino and 23.5 per cent. Crossbred; and the clip of 1924-25 as 81.5 per cent. Merino and 18.5 per cent. Crossbred. I admit, however, that in 1924-25 most of the carry-over wool was Crossbred, and that, owing to the extended use of Merino sires of late years, much of the Comeback or Crossbred wool is now so fine as to be bought as Merino. Dealing with the Merino portion of the Australian clip, which over an average of years comprises two-thirds of the total production, it will be seen from the accurate and complete statistics prepared by Bawra and published by the Commonwealth Government during the appraisement period, that the quality of the Australian clip was improving rather than otherwise. For instance, for the year 1917-18 (first complete clip appraised), the number of bales appraised as 70's quality or finer was 204,000, or 10.68 per cent. of the total clip; in 1918-19 it was 255,371 bales, or 12.60 per cent.; and in 1919-20 291,554 bales, or 14.26 per cent. Taking 64's quality, which is fine, but not superfine, Merino wool for 1917-18 the figures were 855,120 bales, and for 1919-20 885,840 bales. I maintain that this ratio is being maintained, and that the clip of 1925-26 is of finer quality than that of 10-15 years ago."

Than Senator Guthrie, it would be extremely difficult to find anyone more competent to speak with greater authority on the quality of the Australian clip, because of his long and general association with it both as a breeder and a broker. Further, his position as Manager of Messrs. Dalgety & Co., at Geelong, the port of the Western Districts of Victoria, which are the home of the fine-woolled Merino, has afforded him opportunities of acquiring a special viewpoint in connection with fine wool.

Senator Guthrie is equally emphatic when dealing with the questioned skill and ability of Australian sheep breeders. He states, inter-alia: "Investigation of the subject proves that the Australian sheep breeders are, if anything, more skilful than their predecessors. During the wool year ending on June 30, 1926, they will have produced a record clip of 2,200,000 to 2,250,000 bales from about 86,000,000 sheep, as compared with about 500,000 bales less in 1891, when flock numbers reached 106,000,000."

These facts are stubborn and irrefutable. The Australian breeder is still capable and skilful. He has caught the mantle of the pioneer with the result which is reflected in the unequalled quality and appearance of the stud master's best.

Though such definite statistics are not available regarding the Western Australian clip, it may be said also with equal emphasis that it has not deteriorated, for this is so visible. Everyone associated in any way with the marketing or production of wool is aware that during the last ten years there has been a distinctly marked improvement both in the quality and "get-up" of our clips, and it is obvious that an improvement in the clip is impossible without a corresponding improvement in our flocks. This forward movement received a distinct fillip with the inauguration of the appraisement scheme and the display of our clips on the show floors of our local wool brokers. This has been followed up by an active educational campaign by the staffs of the wool-selling firms, and by the Department of Agriculture, with the gratifying result indicated.

The allegations are erroneous. As is usual in such cases, they are based upon general conclusions drawn from a particular case. Sheep breeders are in consequence unlikely to accept the advice given as to the methods for the improvement of their flocks in order to remedy a state which has been shown not to exist. In attempting to advise a sheep breeder as to the type of wool he should produce, any wool buyer is on very dangerous ground, and in this connection it may be pointed out that if the whole of the Merino wool produced could be turned into the qualities that have been advocated the supply would far exceed the demand, and the Australian clip would be of less value than it is to-day.

The question must be viewed from many angles; Mr. Bennett has viewed it from one only. As a wool buyer, and for economic reasons, Mr. Bennett has naturally the strongest desire to secure the type of wool which he requires, and which he has difficulty in obtaining, but whether the grower, who is also a business man, will produce the wool of the higher counts, which this buyer is so anxious to secure, will depend entirely upon economic factors. The wise grower breeds the type of sheep which is the most profitable, and for which his country is adapted. These conditions will, therefore, be the deciding factors in determining whether lambs, mutton, or wool are produced.

It has to be remembered also that environment as well as breed influences the type of wool produced, and in consequence the climate and country of the grower will to some extent influence the quality of the individual clip. The production of high counts is, therefore, to the breeder, largely a matter of price, and to-day he is aiming to produce sheep that will stand up against fluctuating values and adversity. However, whatever type is produced there is no need for the bulk of it to be other than to possess the characteristics of being bright and soft handling—characteristics which have enabled Australian Merino to earn the reputation it now possesses for its wool, and because of which it is in such great demand.

When Mr. Bennett refers to the classing and packing of the clip he is on much sounder, and very firm, ground, and Senator Guthrie is in accord with his criticism. As a wool buyer, and because of the official position he holds in the Association, his opinions on this point carry great weight, and his well-meaning criticism will do incalculable good if we are prepared to profit by it.

The inclusion of rough harsh wool technically termed "doggy," in bales of finer fleeces, is not only faulty classing, but is inexcusable and costly to growers. Though its inclusion is called faulty classing, its presence is not always the fault of the wool "classer," but is due sometimes to the neglect on the part of the "station" to provide the "classer" in charge of the clip with sufficient workmen to properly trim the fleeces before they are rolled and presented to him. This position has arisen, in some instances, because he has progressed in one direction and has not realised the necessity for a similar advance in a consequential direction. The number of sheep shorn daily has been "speeded up," and in consequence there are an additional number of fleeces to be dealt with each day; this obviously requires an increased number of men to skirt the fleeces properly, and unless these are provided, the wool rollers, in order to keep the "board" clean, slum the skirting, with the result that a rough harsh portion of the fleece, which should have been removed, is left on and goes with the fine wool.

Though this rough, harsh "doggy" wool is quite unsuitable for mixing with the finer quality, it has its value for other buyers, and if classed and baled separately, will fetch its full value. The necessity for removing it from the other wool cannot be too strongly emphasised, and so as to reduce the quantity in the clip sheep producing irregular fleeces containing such wool should be culled and killed for meat and not used for breeding purposes.

"Doggy" wool is found in sheep which produce irregular fleeces. In order to reduce the number of these fleeces to the minimum it is just as essential that sheep which produce them should be kept out of the Merino or Crossbred flock as that the wool should be kept out of the bales set aside for the finer wool. The practical elimination from the flock of sheep which produce irregular fleeces which are characteristic of the "doggy" type, is considered to be a matter of breeding along the right lines. It is believed the presence of harsh wool in the Merino flock is accentuated by the use of Merino rams which are the progeny of two different strains of Merino. Such an animal may possess great individual merit, and be of excellent and outstanding appearance. In fact, in view of what is known about the laws of heredity, this is to be expected. Thanks to the progress which has been made in the new science of Genetics (the study of Inheritance) something is now definitely known about the laws of heredity, though much more is still to be learnt, and these tell us very definitely that very often the product of mixed strains is very much superior in appearance to either of the parents, but they also tell us—and this is most important to the breeder—that the product of mixed blood, though possibly uniting in itself many of the good characters of both parents, is almost certain not to be able to transmit them except to an extremely small percentage of its progeny. In other words, such an animal does not possess that fixity of type which is so essential to enable a parent to transmit to the progeny those qualities of individual merit possessed by it. Further, as the result of the mixing of the strains there has been broken that fixity of type which is only obtained as the result of careful selection with defined objects through many generations of both parent ancestors. When this fixity of type is broken variations, and often great variations or irregularities, are the result. To this, it is believed, may be attributed the undue proportion of irregular fleeces containing the "doggy" wool.

The mixing of strains is for the "master breeder," not for the flock master.

The presence of irregular fleeces is more common in a Crossbred than in a Merino flock, but even in Crossbred flocks it is not usual to find them amongst sheep of the first cross, and their presence is mainly due to the failure on the part of the breeder to absolutely dispose, for lamb or mutton (as should be done), of all animals, including ewes, of the second cross, instead of keeping them under any circumstances for wool production. The experience and practice recommended in connection with these flocks is in accordance with the Mendelian law which teaches us to expect uniformity in the first generation and variation in the second.

Though the classing of the wool clip in Australia may have retrogressed, this is not so in Western Australia. As pointed out earlier, a great advance in the "get-up" of the States' clip has taken place during the past decade, but much still remains to be achieved. In this connection the wool selling firms are still unsparing in their efforts to improve matters, as is also the Wool Branch of the Department of Agriculture. This Department has already issued a bulletin dealing with the matter in which the details of classing a farmer's clip are graphically illustrated, and shown in a new and simple way, whilst the details are explained in plain language. The Sheep and Wool Inspector already has well in hand preparations for display at the Royal Agricultural Show and also at country shows, exhibits which, by means of wool samples, clearly illustrate how a farmer's clip should be classed.

CAPE TULIP.

(*Homeria miniata.*)

A POISON PLANT.

J. F. FILMER, B.V.Sc.,
Veterinary Officer.

The attention of the Veterinary Branch has on several occasions been directed to the mortality occurring amongst cattle which have eaten Cape Tulip (*Homeria miniata*).

This is a plant belonging to the Iris family. It springs from a small bulb half to one inch in diameter. The leaves, two in number, are like coarse blades of grass, ribbed, fibrous, and up to two feet in height. The flowers are yellow or salmon pink, and have six petals. The plants come up after the first heavy rains, flower from August onwards, and die in the late summer.

As its name indicates, Cape Tulip is a native of South Africa. It is now fairly widely distributed throughout the Southern districts.

Cattle reared where the plant grows will not touch it, and may be seen grazing in paddocks where it is plentiful. Strange cattle will, however, often eat the plant with fatal results.

An annually recurring mortality amongst cattle in the Fremantle district was recently proved to be due to the eating of this plant.

An investigation was commenced on the 18th April. The history showed that for the past twenty years cattle which had grazed on a particular patch of country had died just after the first heavy rains.

This year one cow died about 1st April. Another was found affected about that date, and was still alive on the 18th April.

Eight cows became affected on 17th April. Six died on that date, and the other two were still ailing on 18th April.

During the investigations the following cases were seen:—

Black and White Cow.—This cow was seen well on the 16th April, and found dead on the 17th April. A *post mortem* examination was made on the 18th April. Cow was very fat. It was much distended with gas, some of which had found its way into the tissues under the skin. Putrefaction was commencing, and probably cloaked some of the lesions. The rumen (paunch) or first stomach was filled with dry fibrous material. The contents of reticulum (honeycomb) or second stomach, the omasum (bible) or third stomach, and the abomasum or fourth stomach were softer than usual. The intestines or bowels were almost empty. The caecum (or blind gut) and the next few feet of intestines showed dark stripes of inflammation as well as some red spots.

The cow "Stylish" was first seen ill about 1st April. From that time she was unable to rise, being paralysed in the hind quarters. When seen on the 18th April pneumonia had supervened. This caused her to be feverish, and her breathing to be rapid.



A. Homeria miniata. Two-leaved Cape Tulip.
B. & C. Homeria collina (C. capsule). One-leaved Cape Tulip.

She died on the 19th April, and a *post mortem* examination was made on the same day. The lungs showed the abscesses and consolidation of septic pneumonia. The contents of the paunch and bible were dry, those of the honeycomb and fourth stomach were normal.

There were a few ulcers in the paunch. The fourth stomach was red and much inflamed. The small bowels were inflamed, and showed dark stripes and honeycomb markings. The blind gut was red and inflamed. The next few feet and the last foot of bowel showed dark striping. The liver, kidneys and bladder were inflamed.

The cow, "The Goat," was first seen ill on the 17th April. On 18th April she was found lying down. On rising she was very stiff, especially in the hind legs, and could only walk about 50 yards before she went down. This cow was killed, and *post mortem* examination made at once.

The contents of the paunch and bible were dry, those of the honeycomb and fourth stomach were normal. The bowels were almost empty.

The fourth stomach was red and inflamed. The small bowels showed a few small patches, which were red and slightly inflamed.

The last foot of the bowels showed dark striping. The outer and inner linings of the heart showed red spots.

The cow, "Blue Bottle," first showed symptoms on 17th April. On 18th April she was found lying down. She rose with difficulty, and walked stiffly about 20 yards, when she again went down. This cow drank well and ate a little feed. She was drenched on two occasions with Condy's crystals. On 22nd inst she walked over a mile, and seemed well on the way to recovery.

Investigation discovered a patch of Cape Tulip about 200 yards long and about 100 yards wide at its widest part. Some of the plants had been nipped off.

In order to confirm the opinion that this plant was responsible for the trouble, about two pounds of the leaves were chopped up and fed to a healthy cow on the morning of the 21st April. On 22nd April this cow was found dead, and a *post mortem* examination was made.

The heart showed dark spots on the inner and outer linings. The spleen (melt) showed a few small dark spots. The fourth stomach was reddened and inflamed. The small bowel showed patches of inflammation. The blind gut and the next few feet of bowel showed dark striping. The last foot of bowel showed slight dark striping.

The cases have been described fairly fully, because they illustrate the different conditions which may be found.

The "black and white cow" had probably had a big dose and died quickly.

The cow "Stylish" had apparently not had such a big dose, but had become paralysed and then pneumonia set in and killed her.

The cows "Blue Bottle" and "The Goat" had probably only had a few mouthfuls. The experimental cow showed that the plant is very poisonous, as two pounds of leaves was sufficient to kill in 24 hours.

To summarise—the symptoms produced are abdominal pain and stiffness of the hind legs, which may develop into paralysis. The lesions found on *post mortem* examination are very characteristic, and consist of redness and inflammation of the fourth stomach, dark striping of the blind gut and the next few feet and generally of the last foot of bowel. These changes

appeared in all cases. The following appeared in some cases only:—Red patches of inflammation and dark striping on the small bowels, dark spots on the inner and outer lining of the heart and on the spleen, inflammation of the bladder.

The condition would be described as a gastro-enteritis or inflammation of the stomach and bowels.

The means of eradication consist of hand pulling or digging up of the plant before flowering. The bulbs should be burnt or treated with quick lime. If on stubble repeated cultivation may prove effective.

Treatment is not likely to prove effective in bad cases. In milder cases a drench containing Epsom salts 1 lb., potassium nitrate 1 ounce, treacle ½ lb., water 1 quart should be given. It is not certain if the recovery of the cow "Blue Bottle" was due to the Condy's crystals. However, the owner claims to have saved two other animals with this drug. If tried, it should be given early. Dose 1 to 2 drachams thoroughly dissolved in 1 pint of warm water. Plenty of water should be provided. Food should consist of boiled linseed, wet bran, scalded chaff, or green stuff. No dry feed should be given. The animal should be disturbed as little as possible, and shelter should be provided.

THE POINT OF VIEW.

Trouble has a trick of coming butt end first,
Viewed approaching, then you've seen it at its worst.
Once surmounted, straight it waxes ever small,
And it tapers till there's nothing left at all.

So whatever difficulty may impend,
Just remember you are facing the butt end,
And, when looking back upon it, like as not
You will marvel at beholding just a dot.

—*Edwin L. Sabine.*

Our greatest glory is not in never falling, but in rising every time we fall.—*Confucius.*

Why, are all horses swift? Are all dogs sagacious? What, then, because Nature hath not befriended me shall I neglect all care of myself. Heaven forbid! Epictetus may not be superior to Socrates. . . . . I shall never be Milo, and yet I do not neglect my body; nor Croesus, yet I do not neglect my property; nor, in general, do we omit the care of anything belonging to us from a despair of arriving at the highest degree of perfection.—*Epictetus.*

Those who know how to do a thing do not find it difficult; those who find it difficult know not how to do it.—*Confucius.*

SAN JOSÉ SCALE.

GEO. W. WICKENS,
Officer in Charge Fruit Industry.

The above pest was first noticed in West Australian orchards in the late 90's, and at that time its presence was so much feared that infested trees were grubbed out and burned. These measures were not effective, for there were always some trees slightly infested which were not discovered, and which served to carry on the disease. The next treatment tried was fumigation with hydrocyanic acid gas. This was persevered with for several years, and proved effective so far as the treated trees were concerned, but, like the first-tried burning method, there were always some infested trees which escaped attention, and the expense of fumigating large orchards deterred growers from treating the whole of their deciduous trees whether infested or clean, which is the only effective way, once the pest is established, of combating it. No matter how careful the search, nor how keen the searcher's eyesight, it is quite impracticable, if not impossible, to find every infested tree in an orchard of bearing age.

The next method of control to be tried, during the dormant season, and which is still practised, was spraying, using lime sulphur, or spraying oil, or both, with a month to six weeks' interval between the applications. Whenever two sprayings are carried out in a thorough manner the pest can be, and is, brought down during winter to such small proportions that it is difficult to find a single infested fruit in the following summer, even though the trees may not be quite free.

Sometimes it is difficult, owing to prolonged wet weather, to spray large orchards twice during the dormant period, but there is always sufficient good weather to allow of one thorough spraying, and every effort should be made to accomplish two.

All growers whose orchards are known by the District Orchard Inspectors to be infested with San José Scale will receive a form of instructions in May or early June of this year, either by registered post or delivered by hand, setting out the treatment which *must* be carried out before the 7th September next, and also advising further treatment in addition to that which is compulsory.

Under the regulations of "The Plant Diseases Act, 1914-25," any grower who receives one of these notices, whether by registered post or delivered by hand, must comply with the instructions printed thereon. Anyone failing to comply is liable to prosecution, and the minimum fine for this offence is £5, and the maximum £100. The directions for treatment on the notice referred to are as follow:—

"All deciduous trees throughout the orchard must be thoroughly sprayed while the trees are dormant, before 7th September, 192 , with one of the following:—

(a) Registered brand of Commercial Lime Sulphur Wash at a strength of one gallon of the stock solution in seven gallons of water; or

(b) Home-made Lime Sulphur Wash made up of 53 lbs. freshly burned lime, 100 lbs. Sulphur, 50 gallons of water. This is a stock solution and must be used at a strength of one gallon in seven gallons of water; or

(c) Registered brand of Prepared Spraying Oil used at a strength of 1 gallon of Spraying Oil in 19 gallons of water."

NOTE.

The Department strongly recommends—

(1) That when an orchard is badly infested with San José Scale two sprayings should be applied while the trees are dormant, the first spraying to be completed before 30th June, the second before 7th September.

(2) That when an orchard is infested with the Red Mite in addition to San José Scale, prepared Spraying Oil should be used for the first spraying, and Lime Sulphur for the second.

If any further information is required, apply to the District Orchard Inspector, whose name is attached to the instructions on the back of form delivered.



Plot of Lucerne, T. O. Weyman's Farm, Bencubbin.

COPPER POWDERS FOR THE PREVENTION OF BALL SMUT IN WHEAT.

GEO. L. SUTTON,
Director of Agriculture.

Following upon the investigations and conclusions of Dr. Darnell-Smith in New South Wales demonstrations of the dry method with carbonate of copper powder in comparison with the wet bluestone method for the prevention of ball or stinking smut in wheat were carried out at the Narrogin School of Agriculture, and at the Chapman and Merredin Experiment Farms in 1917. In that year they were, however, a failure, owing to the infertility of the smut spores with which the seed was infected. They were continued in the next year with the following results:—

THE PREVENTION OF BALL OR STINKING SMUT.

RESULT OF DEMONSTRATION—1918.

Treatment.	Rate per 1,000.							
	Chapman.		Narrogin.		Merredin.		Average	
	Seeds Germinated.	Smutted Plants.	Seeds Germinated.	Smutted Plants.	Seeds Germinated.	Smutted Plants.	Seeds Germinated.	Smutted Plants.
Bluestone and Lime Water	796	7	694	3	430	...	640	3
Dry Copper Carbonate ...	858	...	740	8	472	8	690	5
No treatment	820	312	754	146	596	298	723	252

The test in this demonstration was a very severe one, for the seed was infected as heavily as it could be, so heavily as to be quite black. The results conclusively demonstrated the efficiency of carbonate of copper for preventing smut. At that time commercial carbonate of copper was not obtainable in large quantities, and the obvious application of these demonstrations to farm practice could not then be made. Considerable interest was, however, aroused amongst the farmers regarding the many advantages, especially the absence of injury to the vitality of the treated seed, and the ability to treat the seed well in advance of planting.

With the return to more normal conditions after the close of the war, the demonstrations were resumed in 1922, and tests included to determine the effect of powdered copper sulphate (bluestone) as a substitute for copper carbonate, because of the scarcity and high price of the latter. In the two

succeeding years the tests were extended to include a mixture of copper sulphate, and a low-grade but cheap copper carbonate ("Corona") sulphur, and mixtures of some of the fungicides with air-slaked lime.

"Corona" copper carbonate is a preparation sold by the Pittsburg Plate Glass Company, of Newmark, New Jersey, U.S.A. Examined and reported upon by the Government Mineralogist and Analyst (Dr. E. S. Simpson), it was found that it contained copper 20.8 per cent.

Powdered copper sulphate was obtained by grinding commercial bluestone (98 per cent.) in a mortar, and passing it through a sieve having 60 meshes to the lineal inch.

The dehydrated copper sulphate was obtained by heating commercial bluestone crystals in a hot air oven at 110 degrees C. until powdery, when they were further ground in a mortar and sifted through a fine (60 mesh) sieve. This powder when stored in a stoppered bottle kept its condition well. In air it absorbed a little moisture and regained some colour, but remained in a powdered form. Wrapped in a wet bag it recrystallised. When mixed with equal quantities of air-slaked lime and placed in a stoppered bottle it became damper than the powder in a similar bottle, but still remained as a good powder.

The sulphur used was the ordinary commercial flowers of sulphur.

The air-slaked lime was the resulting product of exposing builders' lime to the air until thoroughly slaked, and passing it through a fine (60 mesh) sieve.

In 1923 some rough trials were made to determine the maximum amount of some of the different dusts retained on the wheat grains. From the results obtained it was calculated that the maximum amounts retained by a bushel of grain of the different powders tried would be:—

"Corona" copper carbonate—5 ounces.
Commercial copper carbonate—2½ ounces.
Commercial copper carbonate and air-slaked lime—4 ounces.
Dehydrated copper sulphate and air-slaked lime—6 ounces.
Flowers of sulphur—3 ounces.

Prior to 1924 the infection of the seed with smut spores before treatment with the fungicides was as severe as it could be made—it may conveniently be described as "saturated." In 1924 the grain was less severely smutted. This was done with the desire to obtain results which could be compared with those obtained in similar tests which had been carried out in California. The rate of infection carried out in the Californian trials was in the proportion of one part (by weight) of smut spores to 750 parts (by weight) of grain. This "dosage" of smut was only about one-twentieth of that given in previous years.

The trials from 1922 to 1924 were carried out at the Chapman and Merredin Experiment Farms. As smut control is affected by climatic conditions, and as it had been found that the effect of these would not be as

great at Merredin as at Chapman, a summary of the results obtained at the former station is given hereunder:—

MERREDIN EXPERIMENT FARM.

FUNGICIDE EXPERIMENTS—1922–24.

Average Results.

	Year.	No. of Seeds germinated.	No. of Plants died during growth.	Analysis of Matured Plants.		
				No. of Plants matured.	Per cent clean.	Per cent. smutted.
CONTROLS.						
Infected (saturated) but untreated ...	1922	82	10	72	23	77
Do. do. ...	1923	...	...	86	47	53
Infected (1–750) but untreated ...	*1924	96	3	93	26	74
WET METHODS.						
Copper Sulphate solution—						
1½ per cent. for 3 minutes ...	1922	53	7	46	99	1
1½ per cent. for 3 minutes followed by subsequent immersion in Ca (OH_2)	1922	68	11	57	98	2
DRY METHODS.						
Copper Carbonate, 2ozs./bus.	1922	68	0	68	100	0
Dry Powdered Copper Sulphate 2ozs./bus.	1922	92	7	85	67	33
Dry Powdered Copper Sulphate ...	1922	92	7	85	56	44
Copper Carbonate, 2ozs./bus.	1923	...	...	79	86	14
" Corona " Copper Carbonate, 4ozs./bus	1923	...	...	79	83	17
Dehydrated Copper Sulphate, 3 ozs./bus	1923	64	2	62	97	3
Dehydrated Copper Sulphate and air-slacked lime (1 : 1), 6 ozs./bus. ...	1923	...	...	79	78	22
Copper carbonate, 2 ozs./bus.	*1924	97	1	96	98	2
Copper carbonate and air-slacked lime (2 : 1), 3 ozs./bus.	*1924	98	1	97	88	12
Copper carbonate and air-slacked lime (4 : 1), 3 ozs./bus.	*1924	96	0	96	97	3
Dehydrated Copper Sulphate, 2 ozs./bus.	*1924	97	2	95	99	1
Dehydrated Copper Sulphate and air-slaked lime (1 : 1), 3 ozs./bus. ...	*1924	99	2	97	97	2
Sulphur, 4 ozs./bus.	1923	...	...	69	65	35
Sulphur and air-slacked lime (1 : 2), 4 ozs./bus.	1923	...	...	60	58	42
Infected 2–750 untreated	1924	94	3	91	40	60
Infected 2–750 Copper carbonate, 2 ozs./bus.	1924	96	1	98	98	2

* Bunt infection, 1924, 1–750. Previous years very heavily smutted (" saturated ").

These results confirm the previous ones regarding the efficiency of carbonate of copper for preventing ball smut, and its non-injurious effect upon the germination and vitality of the grain. They also show that its efficiency is lessened to a limited extent by an excessive infection of smut on the seed. This is not of very material concern to the farmer as rarely, if ever, would he use seed so badly infected as to be influenced by this. Sulphur proved quite unsuitable and "Corona" copper carbonate, which contains slightly less than half the quantity of copper found in ordinary commercial copper carbonate, was about as effective as the latter when used at twice its rate. The diluted mixture of copper carbonate and air-slaked lime in the proportion 2:1 was less efficient than carbonate of copper without dilution. This dilution was tried with the object of rendering the carbonate of copper less disagreeable to handle when treating and sowing the seed. Dehydrated copper sulphate proved efficient, but as carbonate of copper and other suitable copper dusts had become readily available at cheap rates there was no need to investigate its possibilities further, or those of the lower grade "Corona" copper carbonate.

In this connection it is interesting to record that as the result of very careful inquiries it has been ascertained that in 1922 the total available quantity of commercial copper carbonate obtainable in Perth was 56 lbs., and this was purchased at 2s. 6d. per lb. In 1923 the sales amounted to three tons; in 1924 to 18½ tons, and in the present season to 38 tons, when the price had fallen to 1s. 2d. per lb.

With the increasing appreciation on the part of farmers of the value of copper carbonate for the prevention of ball smut, as has been shown, there has been a rapid increase in the demand for this fungicide, and in consequence brands of varying quality in regard to their physical properties and chemical composition came on to the market. With the object of determining the fungicidal activity of these so that some standard might be set for the protection of the farmer, it was decided to include amongst the fungicide experiments for the past season a test to determine the fungicidal properties of six brands of copper carbonate and two other copper powders, viz., "Smutol" (copper oxychloride) and copper acetate, purchased on the local market, and at the same time to compare different rates of treatment, viz., 2, 1½, and 1 ounce per bushel of copper carbonate, "Smutol," and copper acetate per bushel. Samples of the different compounds were submitted to the Government Mineralogist and Analyst (Dr. E. S. Simpson), who furnished the following details regarding their chemical composition and physical properties:—

Analyses of Fungicides for Tests—1925.

Fungicide.	Copper.	Retained by 200 mesh sieve.	Density.
	%	%	lbs. per cubic foot.
Copper Carbonate "A"	46·48	43·6	63·2
" " "B"	50·04	0·6	58·5
" " "C"	51·08	17·5	61·0
" " "D"	49·88	5·15	76·9
" " "E"	49·76	7·2	68·1
" " "F"	53·48	8·3	72·2
Smutol	54·36	12·2	40·2
Copper Acetate ...	29·96	...	...

An analysis of a sample of commercial copper carbonate, representing the best on the Californian market, was also submitted to the Government Mineralogist and Analyst (Dr. E. S. Simpson) for analysis, with the following result:—

Copper—50.36 per cent.

Portion retained on 200-mesh sieve—6.20 per cent.

Density—62.5 lbs. per cubic foot.

For the purpose of these tests, seed of the variety "Booran," a variety very liable to ball smut was used. It was infected with smut spores which had been examined and tested by the Botanist and Plant Pathologist (Mr. W. M. Carne), who reported that they belonged to the species *Tilletia levis*, and that they were of good vitality. The rate of infection was the same as that used in the Californian experiments, and was in the proportion of smut spores one part to wheat 750 parts (by weight). When so treated the pres-

ence of smut on the grain was not very noticeable except on the brush; the grain was, however, duller, and it had a very slight characteristic odour. The method of infection adopted was to place the weighted quantities of smut and wheat respectively required in a glass jar, and thoroughly shake it until the spores and grain were properly mixed.

After infection separate portions of the grain were treated in accordance with the requirements of the experiment by shaking the infected grain and the necessary quantity of the fungicide in a "Mason" fruit jar. The treatment given to the seed after infection was in accordance with the following scheme:—

CONTROLS UNTREATED.

1.—Copper carbonate	A	—2oz. per bushel.		
2. „ „	B	— „	„	
3. „ „	C	— „	„	
4. „ „	D	— „	„	
5. „ „	E	— „	„	
6. „ „	F	— „	„	
7.—"Smutol"		— „	„	
8.—Copper acetate ...		— „	„	
9.—Copper carbonate	B	— 1½oz. per bushel		
10.—"Smutol"		— „	„	
11.—Copper acetate ...		— „	„	
12.—Copper carbonate	B	— 1oz. per bushel		
13.—"Smutol"		— „	„	
14.—Copper acetate ...		— „	„	

The experiment was divided into four sections—the first in which the different brands of carbonate of copper were compared; the second, in which carbonate of copper B, "Smutol" and copper acetate were mixed with the seed at the rate of two ounces per bushel and compared, and the third and fourth sections in which these fungicides were compared when mixed with the grain at the rates, respectively, of one and a-half and one ounce per bushel. The plots in each section were planted in sequence, and were repeated five times.

The experiments were planted in a similar manner in the Test Rows at the Chapman and Merredin Experiment Farms. Each plot consisted of 100 seeds, and these were planted in a drill one chain long in which the seeds were dropped by hand one link apart, which permitted easy access and observation.

At Chapman the seeds were planted in moist ground on 18th May, and at Merredin after rain on 29th May. The plants which were above the ground were counted at ten-day intervals until the 30th day. As the grain matured each plant was carefully examined for the presence of smut, and the number of plants in which the disease was found were recorded as "smutted" plants.

The field work in connection with these trials was carried out in a most careful and satisfactory manner by Mr. E. Limbourn at Merredin and Mr. D. R. Bateman at Chapman, and from whose records the following results have been compiled:—

FUNGICIDE EXPERIMENT.

MERREDIN EXPERIMENT FARM—1925.

Variety "Booran."—Infected with 1 part spores (Tilletia levis) to 750 parts of seed—Planted 29th May, 1925.

No.	Treatment.	No. of seeds planted.	Details of Growth. Per cent. germination at 30 days.	Details of Matured Plants. No. of plants matured.	No. of clean plants.	No. of bunted plants.	Per cent. bunted plants.
			%				%
	Control untreated	500	84	429	310	119	28
	SECTION I.						
1.	Copper carbonate A 2ozs. per bus.	500	91	459	459	...	...
2.	" " B " "	500	91	456	456	...	...
3.	" " C " "	500	88	448	445	3	1
4.	" " D " "	500	82	418	418	...	...
5.	" " E " "	500	83	419	418	1	...
6.	" " F " "	500	84	420	418	2	1
	Control untreated	500	84	435	335	100	23
	Infected—untreated—control ...	500	86	433	355	78	18
	SECTION II.						
2.	Copper Carbonate B. 2 oz./bus. ...	500	90	430	430	...	...
7.	"Smutol"	500	86	441	441	...	...
8.	Copper Acetate	500	86	422	420	2	1
	Infected—untreated—control ...	500	85	418	320	98	23
	SECTION III.						
9.	Copper Carbonate B. 1½ oz./bus.	500	86	416	416	...	...
10.	"Smutol"	500	87	442	442	...	...
11.	Copper Acetate	500	84	432	429	3	1
	Infected—untreated—control ...	500	87	432	329	103	24
	SECTION IV.						
12.	Copper Carbonate B. 1 oz./bus.	500	87	434	433	1	...
13.	"Smutol"	500	84	428	427	1	...
14.	Copper Acetate	500	89	427	391	36	8
	Infected—untreated—control ...	500	82	395	324	71	18

Average all controls 22·4% bunted plants.

CHAPMAN EXPERIMENT FARM.

1925.

Variety "Booran." Infected with 1 part spores (Tilletia levis) to 750 parts of seed. Planted 18th May, 1925.

No.	Treatment.	Details of Growth.			Details of Matured Plants.		
		No. of seeds planted.	Percentage germination at 30 days.	No. of plants matured	No. of clean plants.	No. of bunted plants.	Percent. bunted plants.
			%				%
	Infected—untreated—(control) ...	600	94	556	487	69	12
	SECTION 1.						
1	Copper Carbonate A. 2 ozs./bus. ...	500	94	458	458	0	0
2	" " B. " ...	500	93	459	459	0	0
3	" " C. " ...	500	89	440	440	0	0
4	" " D. " ...	500	91	446	446	0	0
5	" " E. " ...	500	91	446	445	1	0
6	" " F. " ...	500	93	451	451	0	0
	Infected—untreated (control)	500	97	470	409	61	13
	Infected—untreated—control ...	500	90	446	382	64	14
	SECTION 2.						
2	Copper carbonate B. 2 ozs./bus. ...	500	95	462	461	1	0
7	"Smutol" ... "	500	96	472	472	0	0
8	Copper acetate ... "	500	91	447	447	0	0
	Infected—untreated—control	500	91	449	391	58	13
	SECTION 3.						
9	Copper carbonate B. 1½ozs./bus. ...	500	95	461	461	0	0
10	"Smutol" ... "	500	92	450	449	1	0
11	Copper acetate ... "	500	96	462	461	1	0
	Infected—untreated—control ...	500	94	464	408	56	12
	SECTION 4.						
12	Copper carbonate B. 1 oz./bus. ...	500	89	444	444	0	0
13	"Smutol" ... "	500	92	457	457	0	0
14	Copper acetate ... "	300	95	469	467	2	0
	Infected—untreated—control	500	90	449	389	60	13

Average all controls 12·8% bunted plants.

With the exception that they show that the smaller quantity (one ounce per bushel) of copper acetate to be insufficient to satisfactorily prevent the occurrence of smut in the crop, the results are uniformly good, indicating that under the soil conditions which obtained when the seed was planted, any of the copper compounds very efficiently controlled the disease, for in the control (untreated) plots the average number of plants smutted was 22 at Merredin and 13 at Chapman. There are some very slight variations, but these are so small that they must be ascribed to those differences which are inseparable from field experiments of this character, and despite the repetition adopted to guard against this.

These results cannot, however, be accepted as conclusive, for it is known that climatic and soil conditions affect the control of this disease, and when a comparison is made between the number of smutted plants found in the control (untreated) rows in this experiment and the one conducted the previous year with the same variety, infected in the same way, and at the same rate, and also planted in the same manner, it will be seen that the season

has probably influenced the results which have been obtained with the treated seeds. In the previous experiment (1924) the average percentage of smutted plants found in the control (untreated) rows was 74 at Merredin and 30 at Chapman. In the present experiment the percentages are respectively 22 and 13.

These experiments are being repeated this year at both farms. To increase the severity of the test to which the fungicides are to be subjected, and at the same time to guard to some extent against the effect of seasonal conditions, the rate of infection has been increased to the old "saturated" rate, viz., 20 parts of smut spores to 750 parts (by weight) of grain.

Give fools their gold and knaves their power;
Let fortune's bubbles rise and fall;
Who sows a field, or trains a flower,
Or plants a tree, is more than all.
For he who blesses most is blest;
And God and man shall own his worth
Who toils to leave as his bequest
An added beauty to the earth.

Whittier.



POTATO CHIPS.

G. N. LOWE,
Senior Potato Inspector.

CROPS AT ALBANY.

Albany growers, particularly those along the Denmark line, have had splendid crops, and with the high prices ruling they are generally very pleased with themselves.

Probably the most outstanding crop was that of Mr. Albert Martin, at Young's Siding, who from 4¾ acres harvested 850 bags of splendid "Delaware." Portions of the crop were remarkable; for instance, four square chains produced 126 bags, which works out at 20 tons per acre. In discussing the crop, Mr. Martin stated that he felt sure that had the land been a little less moist the crop would have been even better. That's the spirit ! !

One bag of the large tubers from this crop, obtained for the exhibit of the Potato Branch at the Royal Show, was filled by only 89 tubers, 12 of which weighed 26½ lbs.

Other fine crops were those of Mr. T. H. Tonkin and Mr. M. Ryan, portions of which reached 16 tons per acre.

The land is rich peat, similar to thousands of acres of our coastal swamps, which, with like treatment in the matter of careful seed selection and adequate fertilising, will certainly give big returns.



View of Potato Fertiliser Experiments at Young's Siding, Denmark Line, showing product of single rows.

The area mentioned (Lake Saide) was up till recently more or less unsafe, because of the risk of flooding, but with a very fine drain now operating this risk has now largely disappeared.

It is interesting to note that these heavy crops have been grown from "Delaware" seed, which Mr. Tonkin originally secured from the State Farm at Brunswick some eight or nine years ago. Selection since has been careful, so much so that it is unusual to find a single plant in these crops which is not true to type and variety.

BENGER SWAMP.

Growers here have not been nearly so fortunate, as due very largely to the dry spell during the growing-period, the crop yielded only in the region of 3½ tons per acre.

The worst feature of the business, however, is the lack of care apparent in the matter of seed selection. The effects of this are too painfully demonstrated this season, and are going to have disastrous consequences unless corrected right away. A light crop is soon forgotten, but the effect of seed from poor stock and containing all sorts of mixtures is ruinous. Small whole tubers ("round seed" as it is generally termed) have possibly only one saving feature in the South-Western summer planting—that of greater germination than large tubers cut and planted at once. In view of the results of an English experiment recently to hand, it is quite likely that even this present advantage may disappear as described below. The great drawback, however, is the certainty that the bulk of such small tubers is produced by poor yielding plants of "Delaware," "Yellowtails," "Northern Star," and every other mixture in the crop, and all such rubbish goes into the bag as "round seed."



Twelve tubers weighing 26½lbs. from portion of crop (which yielded 20 tons per acre) grown by Mr. Albert Martin, Young's Siding. Note size of normal tuber.

A simple remedy suggests itself, and this is nothing more than saving from the next November digging as many bags as possible of large tubers from selected roots (not just large potatoes, although this is the next best method) and planting such selected large seed *whole* in the swamp. The only drawback is the extra cost per acre for seed, which after all is infinitesimal compared with the advantages of keeping up the all important productive strain.

A trial of a bag or two of seed cut and treated according to the method adopted in some recently concluded English tests is also worth while.

ENGLISH GERMINATION TRIALS.

The relative germination of whole and cut seed was the subject of the test, and it was shown that cut seed exposed to the sun and air for 24 to 48 hours, may have its germination and yield reduced more than one-half in comparison with cut tubers kept for the same length of time in a damp warm place. The explanation is that in the moist air the cut surface develops a complete coating of suberin, a substance resembling cork or cellulose. This covering gives the inner tissues of the "set" the necessary protection against moulds and bacteria which cause rotting. In the dry air the suberin does not completely cover the whole cut surface, the bare places giving entrance to harmful organisms. Cold frames were used in the experiment, but boxes lined with wet bags, into which the seed should be cut and again covered with



View of portion of Potato Fertiliser Experiment at Young's Siding, seven weeks from date of planting.

wet bags, would probably give the same result, provided the boxes were kept under cover. Even cutting into wet bags sewn, or tied when filled, might be tried. Anything designed to obviate the necessity for planting "round seed" of poor strain is worth a trial.

Actually in the Benger fertiliser experiment, plots designated "Germination Trials" on these lines were planted, three tests of seed cut and planted at once, treated seed (as above), and seed cut and left exposed being included. Unfortunately, as the plot was spoiled, no records could be taken, but the indications were that the treated seed would have stood the test. At one period another half-inch of rain would, following the ten inches practically continuous, have flooded the whole of the swamp.

CRINKLED LEAF IN DELAWARES.

South-Western growers in particular will soon again be asking what is the cause of this trouble in their July planted crop.

According to Mr. Carne, the Government Botanist, it is quite possible that the trouble is a virus disease, which in America is reducing production to the extent of 25 per cent.

As soon as material becomes available investigations will be put in hand. Actually degeneration is behind it if it prove to be a virus disease, which again leads to that counsel of perfection "Selected Seed."

The trouble is not noted in the summer grown crops, as high temperatures act against it.

POULTRY NOTES.

The average output of eggs on a number of our farms is very unsatisfactory, and at the present high price of poultry foodstuffs, leaves too small a margin between feeding costs and net return from the sale of eggs to make up for time and labour devoted to the care of the birds.

The output could be materially increased if more attention were paid to the selection of the birds for the breeding pen. To them will be entrusted the production of chicks that in due course will develop into layers and breeders, therefore it is essential to breed from none but the best. By concentrating on quality instead of on numbers, and carefully selecting the breeders, the individual and flock average will be increased, with a corresponding decrease in the cost of production.

Trap nesting, or single testing, the latter in particular, are the only reliable means of placing the heavy producers (in their first laying season) to be used as future breeders. In the absence of such means of testing the selection of layers by observation should necessarily follow.

There are certain characteristics generally present in the good layer. With practice and experience these can be readily detected, and they will undoubtedly help the breeder to select his best birds for the breeding pens, as well as cull out and dispose of the "slackers" or poor producers.

The general appearance of a layer is bright, active, alert, healthy and well developed, showing a vigorous constitution. The head should be lean and clean, and the face free from wrinkles, with eyes full, round, prominent and bright; the comb and wattles should be of medium size, thin and fine in texture; the beak short, stout and slightly curved; the neck fine and of moderate length; the body long, wide across the saddle and deep; and the breast bone of fair length to give support to the abdomen, which should be loose and soft; the legs moderate in length, set wide apart, flat rather than round, with small tight-fitting scales; the feathers short and tight-fitting to the body.

In the yellow-leg breeds the good layers generally lose their yellow cast and show beak and shanks white after a spell of heavy laying.

Hens that moult slowly and produce new feathers and are, at the same time, laying, are usually good layers, also hens that are late moulters and keep laying well up into May. Providing they have a robust appearance such birds should be selected as breeders.

The sire should be masculine in appearance, deep chested, with legs wide apart, and have all the characteristics desired in the hen to a masculine degree.

No matter how good a producer a hen may be, she is worthless as a breeder if she is a layer of eggs weighing less than two ounces each. The size of egg is of great importance. The tendency of the hen is to lay eggs under the two-ounce standard, the improvement effected in that respect being the result of years of selection on the part of careful poultry breeders, and unless such selection and care is continually practised, the size of egg will degenerate.

The male bird should be the progeny of a heavy layer of two-ounce eggs or over, otherwise the small egg tendency will be passed on by the sire to his progeny.

In selecting eggs for hatching purposes, freshness is essential, and any over ten days should not be used. They should also be of even size, good shape, smooth and good in texture of shell. Discard over-long, round, uneven, abnormally large, porous or rough-shelled eggs, and those weighing under two ounces.

Hatch from the heavy breeds in July, August, and not later than the first week in September; the light breeds in August and September, and not later than the first week in October. Late hatches are unsatisfactory as well as unprofitable. The birds are slow in maturing, lack robustness, and generally do not come into lay till eight or nine months old, when eggs are plentiful and pullet eggs are a glut on the market.

In conclusion, birds having any of the following defects should be culled out:—

(a) Immature, under-sized, or lacking in stamina.

(b) Over-fat, excessive broodiness, or early moulters.

(c) Dull sunken eye, coarse or "bull headed," long head and beak, heavy overhanging eyebrows.

(d) Coarse texture of comb and wattles.

(e) Doctored birds and those that are in the moult.

(f) Knock-kneed, twisted toes, crooked breast bone, or any other deformities.

PHOSPHATIC FERTILISERS AS MANURES FOR GRASS LAND.

A. B. Adams, Dip. Agric.
Agricultural Adviser, Dairy Branch.

Some farmers have an idea that the feeding of purchased fodders is a certain way of building up their land, and that the enhanced value of the animal manure will make up for any possible loss in the purchase of such fodders. There is sometimes a certain amount of truth in the contention, but usually it is far from the truth. It is particularly inaccurate when dealing with a soil that is naturally deficient in phosphates.

On such soils it has been found that the use of phosphatic fertilisers is a more certain means of improvement, and, in many cases, shows a larger monetary return.

Table 3 shows the result of a ten years' experiment at Cockle Park, where stock on pasture, manured with basic slag, fed with cake on unmanured grass, and receiving cake on manured grass, gave the largest profit on manured grass without cake.

Table 3.

Live weight increase in lbs. per acre over those on unmanured plot.

Mixed grazing, Cattle and Sheep.

Live weight.	Plot 1. Basic slag, 10 cwt. 1903. 5 cwt. 1906, and every 3rd year after.		Plot 2. 3 cwt. cotton cake per acre annually. Slag as Plot 1.		Plot 3. Cake alone. Slag 1903 only.	
Average of—	Cattle. lbs.	Sheep. lbs.	Cattle. lbs.	Sheep. lbs.	Cattle. lbs.	Sheep. lbs.
1904–5 (2 years) ...	111	40	150	57	144	60
1906–8 (3 years) ...	151½	54½	185	62	165	62
1909–11 (3 years) ...	116	71	136	77½	102½	59
1912–14 (3 years) ...	125½	64	144	66	108½	42
1915–17 (3 years) ...	137	63	162	65	105	40½
1917 Season	131	48½	174	60	118	30½
Average annual gain ...	48s. 11d.		18s. 3d.		Loss of 2s. 5d.	

With sheep alone in a different experiment, the average annual gain with slag was 27s. 5d., with cake a loss of 11s. 9d.

In interpreting the above results, it is necessary to remember that they refer to stock on pasture sufficient for maintenance, and do not apply to a bare paddock. When feed is not sufficient for the stock in the scarce time of the year, if hand feeding is not directly profitable, it usually pays better than allowing stock to fall away in condition. Whether the feeding of concentrates is justified or not will depend on the conditions.



Topdressing Demonstration Plot, Dongarra, 2cwt. per acre.
Compare Illustration II.

Practical Notes.

There are certain practical considerations which are perhaps not generally known. Of these few have been definitely proved by systematic experiment, but observation of field results must be accepted until experiment under controlled conditions supplies exact data.

(1.) Basic slag is not usually economically profitable as the unit cost is higher than superphosphate. If a basic manure is found to give the best results on some particular soil, basic superphosphate should give as good or better results, as it is easier to handle, and more easily available to the plant.

(2) On all land, which has not been previously top-dressed, except wet swamp, apply the phosphate with or shortly after the first rains. This will enable a larger number of trefoil plants to survive.

(3) When it is intended to use the paddock for winter grazing, the fertiliser should be applied with the first rains. This will much improve the feeding value of the herbage as well as somewhat increasing the winter growth. The feed will also come away earlier.

(4.) If low lying wet land has been well fertilised the previous season and it is not required for winter grazing, in many cases, particularly in the wetter districts, the top-dressing with superphosphate may be delayed until the end of winter.

(5.) In the case of the smaller clovers and trefoils, the most economical amount of fertiliser appears to be from 90 to 112 lbs. per acre, this quantity giving as heavy a yield as larger applications. It is, however, probable, and results appearing elsewhere in this issue of the *Journal* go to prove that with a heavier dressing the resultant feed might have a higher feeding value. With Subterranean Clover and other heavy yielding legumes, 150 to 180 lbs. per acre usually gives a bigger yield than smaller quantities of fertiliser.

(6.) On very wet and swampy lands the best time to apply the manure is in the spring when the water is drying up.

(7.) If there is a stand of clover or trefoil on either bush country or cultivated land, top-dressing will almost certainly give a profitable result.

(8) The true grasses show a very small direct response to top-dressing, the result with them is generally indirect, following on increased nitrogen in the soil, due to the greater growth of the clovers.

Finally just as the use of superphosphate by the wheat grower has added another province to the State, and turned it from a wheat importing to an exporting country, so the use of phosphatic fertiliser on the grass lands of the areas of heavier rainfall should make that portion of the State an exporter of dairy products.



Topdressing Demonstration Plot, Dongarra.
Compare Illustration I.

Summary.

(1.) The soils of Western Australia are, generally speaking, deficient in phosphoric acid and lime.

(2.) Apart from its necessity in plant growth, this constituent is absolutely essential if healthy stock are desired.

(3.) In districts with an annual rainfall of 16in. or over, the deficiency can be profitably made good by the use of phosphatic fertilisers as a top-dressing for pasture.

(4.) The feeding quality of a plant depends more on the soil than on the variety of that plant grown.

(5.) In the great majority of cases neither lime nor potash are likely to be of benefit until the phosphoric acid requirements of the soil are satisfied.

(6.) Regular fertilising of the pastures with phosphatic fertilisers will improve the soil chemically and physically at less cost and more efficiently than any other method, and will improve good soils, and almost completely alter the character of poorer soils, often making it possible to grow remunerative crops on the latter.

(*Concluded.*)

THE ORANGE RUST MITE.

(*Phyllocoptes oleivorous*, Ashmead.)

L. J. NEWMAN, F.E.S.,
Economic Entomologist.

During the past autumn the attention of the Department was drawn to the unusual appearance of the oranges in one of our citrus areas. Specimens of the injured fruits were secured and a careful microscopic examination made, which revealed the causative factor to be a species of mite, later identified as *Phyllocoptes oleivorous* (Ashmead), commonly known in other citrus-growing countries as the "Orange Rust Mite" or "Maori."

This is the first record of its presence in Western Australia. These mites belong to the order Acarina, and are not true insects. They are thus related to spiders, scorpions, and ticks. The one under review belongs to the family *Eriophydiae*, and to the genus *Eriophyes*. At one time they were placed in the genus *Phytoptus*.



Orange Rust Mite *Phyl'ocoptes o'eivorous* (Ashmead).
Enlarged x 260. (Original.)

The *Eriophyidae* are strictly plant feeders, some causing galls as in the case of the Pear Leaf Blister Mite (*Eriophyes pyri*), a common pest of our orchards. This orange mite is found infesting citrus fruits in other parts of the world. It is regarded as a native of Florida. In Australia the first record was made in the year 1891, when the pest was noted attacking citrus fruits in New South Wales.

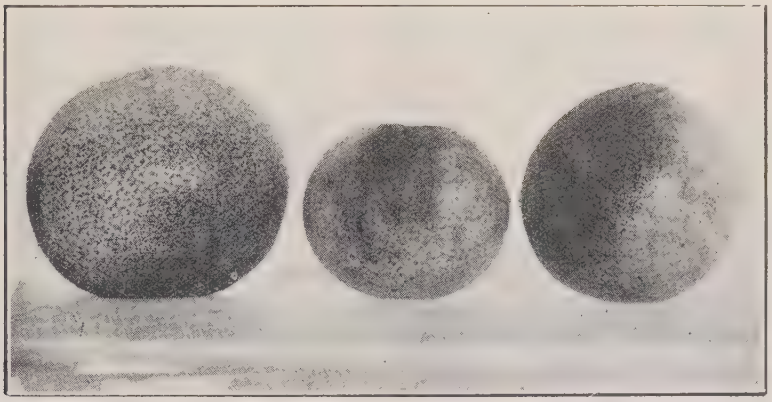
The Orange Mite is a very tiny creature, not measuring more than one-hundredth part of an inch, and is only visible by the aid of a magnifying

lens. The minuteness of these mites is made up for by the great numbers in which they appear. The adult mite has but four legs, all situated on the anterior or head portion of the body, wholly lacking the posterior or hind legs.

The body is divided into two parts, the anterior portion being broad and the posterior very tapered and annulate or ringed. The mouth parts are formed into a rostrum or beak, furnished with a pair of needle-like mandibles with which they puncture the rind of the fruit, thus liberating the oil which they suck up.

The eggs, according to Banks, are spherical, and may be deposited on leaves or fruits, generally in clusters. They hatch in from five to 10 days. The larvæ go through several moults, and after two weeks reach maturity.

The colour of the mite varies from canary-yellow to rusty-brown. The pest gets its popular name from the fact that when it attacks the rind of the orange the skin assumes a rusty-brown colour due to the exudation of the oil, which dries and oxidises. This typical appearance is identical with that known as "Maori" disease.



Oranges showing typical injury to skin or rind by Rust Mite. (Original.)

The fruit is damaged in appearance and from a selling point of view has lost its value. On the advent of early winter rains this mite disappears from the fruits. The hibernating adults probably hide themselves under loose bark or beneath the bud scales, re-appearing in the spring. There are a number of *Eriophyes* mites that are destructive to trees, plants, and fruits. In Eastern Australia the Vine leaf Blister Mite (*Eriophyes vitis*) causes considerable damage to grapes.

Treatment.—Fortunately this pest is not at present widespread, and it it possible it may be eradicated. It is readily destroyed by the use of ordinary contact sprays. A spray which the Department found to be very effective was as follows:—Atomic sulphur one pound, water eight gallons, sprayed thoroughly over leaves and fruits. The addition of Sunlight soap at a strength of three pounds to every 80 gallons of mixture gives a good filming effect, and is recommended.

HERD TESTING.

THE OFFICIAL AUSTRALIAN PURE BRED DAIRY CATTLE PRODUCTION SCHEME.

Conducted by Dairy Branch, Department of Agriculture, Western Australia

Name of Cow.	Owner.	Breed.	Herd Book No.	Age.	Date of Calving.	No. of Days in Test.	Weight of Milk for Period.	Average Test.	Total Butter Fat.	Weight of Milk Last day of Test.	Sire.
MATURE COWS—STANDARD 350LBS. BUTTER FAT.											
				yrs. mth.			lbs.	%	lbs.	lbs.	
Mokine Fancy	T. H. Wilding ...	Jersey ...	8484	5 6	8–7–25	273	9,681	6·00	580·90	25½	Noble's Best of Garden Hill, 1756.
Fairy of Dardanup	R. H. Rose ...	do. ...	8942	7 4	1–1–25	273	10,644	4·69	499·87	23	Carnation's Masterpiece of Garden Hill, 2065.
Treasure 3rd of Homeleigh	D. Malcolm ...	I.M.S. ...	4648	5 0	19–1–25	273	9,924	4·88	484·99	23	Defender of Homeleigh.
Gentle of Blackheath	D. Malcolm ...	M.S. ...	11679	5 0	3–10–24	273	9,903	4·49	445·42	11	Flowers Mayfield of Blackheath, 370.
Gladness of Wollongbar	Department of Agriculture	Guernsey ...	452	6 9	28–7–25	273	8,139	5·02	408·87	23	George 3rd, 15.
Gentle of Blackheath	D. Malcolm ...	M.S. ...	11679	5 11	5–9–25	210	9,740	4·07	396·48	37	Flowers Mayfield of Blackheath, 371.
Cheerful II. of Yarralla	A. H. Henning ...	Jersey ...	6258	8 8	16–10–24	273	6,657	5·49	365·67	19½	Retford Mariposa, 896.
Madge of Dalebank	D. Malcolm ...	do. ...	4759	12 3	31–8–25	210	6,270	5·08	318·93	21	Admiral, 1062.
Mermaid of Blackheath	do.	M.S. ...	12156	5 2	19–2–25	273	7,212	4·38	316·41	19	Flower's Mayfield of Blackheath, 370.
Boronia of Grass Vale	R. H. Rose ...	Jersey ...	9994	5 11	20–7–25	240	6,720	4·68	314·55	13	Noble Fondant of Garden Hill, 2268.
Madge II. of Dalebank	D. Malcolm ...	do. ...	8449	5 0	25–9–25	180	4,185	5·59	234·45	18	Makarini, 995.
Obligato	do.	do. ...	4694	10 6	9–11–25	150	4,320	4·92	212·73	26	Noble Lord, 320 (imp.)
Lily 3rd of Garden Hill	W. Padbury ...	do. ...	11661	5 3	16–9–25	60	1 430	5·12	124·53	59	Campaniles Noble, 840 (imp.)
Lotus Queen of Wongamine ...	Walker & Co. ...	do. ...	10064	6 1	20–5–25	90	2,010	4·74	95·31	14	Werribee Lotus King, 325.
COWS (OVER 4½ YEARS AND UNDER 5 YEARS)—STANDARD, 325LBS. BUTTER FAT.											
Mokine Empire Lily 6th	T. H. Wilding ...	Jersey ...	10636	4 7	14–4–25	273	9,652	6·12	591·49	27½	Noble's Best of Garden Hill, 1756.
Mokine Empire Lily 5th	do.	do. ...	10635	4 9	22–5–25	273	8,304	6·66	553·83	23	Noble's Best of Garden Hill, 1706.
Morden Lady of Koojan	A. W. Padbury ...	Guernsey ...	722	4 8	12–4–25	273	8,817	4·19	369·71	94	Faust of Waterville, 221.
Mokine Lady Noble	Walker & Co. ...	Jersey ...	10633	4 10	2–11–24	273	6,361	5·61	357·03	15½	Noble's Best of Garden Hill, 1756.
Virginia of Nundorah	A. W. Padbury ...	Guernsey ...	775	4 10	30–8–25	273	5,811	5·67	329·99	17	Warrior of Nundorah, 322.
Lady Mints Gem 4th of Garden Hill	W. Padbury ...	Jersey ...	10630	4 7	2–10–25	150	2,910	4·87	141·81	15	Macaw of Banyale, 1756.

COWS (OVER 4 YEARS AND UNDER 4½ YEARS)—STANDARD, 300LBS. BUTTER FAT.

Sheila of Sarnia	D. Malcolm	Jersey	8452	4	3	10–1–25	273	6,535	6·20	405·32	18½	Makarini, 995.
Pride III. of Blackheath	Wooroloo Sanatorium	M.S.	N.Y.A.	4	2	2–5–25	273	8,979	3·67	329·92	23	Eclipse of Blackheath, 974.
Lady Fowler 13th of Dardanup	D. Malcolm	Jersey	8986	4	4	9–6–25	273	6,727	4·90	329·74	17½	King George of Yarralla, 1271.
Velvet of Wollongbar	Department of Agriculture	Guernsey	774	4	5	25–10–24	273	6,996	4·57	320·13	12	Faithful Fido of Wollongbar, 81.
Alice of Blackheath	Wooroloo Sanatorium	M.S.	N.Y.A.	4	3	4–6–25	273	6,879	3·70	254·66	8	Flowers Mayfield of Blackheath, 370.
Pet 8th of Glenview	D. Malcolm	I.M.S.	4647	4	5	2–11–25	150	2,985	4·20	125·52	13½	Cider of Glenview.

COWS (OVER 3½ YEARS AND UNDER 4 YEARS)—STANDARD, 275LBS. BUTTER FAT.

Mokine Empire Lily 7th	T. H. Wilding	Jersey	11794	3	11	12–7–25	273	10,164	5·69	579·11	28	Ettie's Chief of Banyule, 1757.
Milton's Dulcie II.	A. W. Padbury	Guernsey	928	3	8	14–4–25	273	7,707	5·09	392·94	19	Langwater Illustrious, 269
Mokine Clove Carnation	Walker & Co.	Jersey	11796	3	11	11–5–25	273	6,214	6·23	387·73	16½	Noble's Best of Garden Hill, 1756.
Colleen of Rosewood	A. W. Padbury	Guernsey	819	3	7	7–8–25	273	6,126	6·03	369·45	12	Archer of Nundorah, 76.
Sweet Nell of Garden Hill	W. Padbury	Jersey	N.Y.A.	3	11	26–8–25	273	6,072	5·95	361·41	14	Macaw of Banyule, 1754.
Milton's Daisy II.	A. W. Padbury	Guernsey	922	3	11	28–6–25	273	6,787	4·96	388·82	17½	Wickham Goldraiser, 214.
Pet 8th of Glenview	D. Malcolm	I.M.S.	4647	3	8	3–1–25	273	4,848	5·06	245·69	11	Cider of Glenview.

COWS (OVER 3 YEARS AND UNDER 3½ YEARS)—STANDARD, 250LBS. BUTTER FAT.

Carnation 3rd of Greyleigh	D. Malcolm	I.M.S.	Y.A.	3	2	28–2–25	273	9,360	3·92	367·31	25	Foch of Greyleigh.
Bonnie Margaret of Koojan	A. W. Padbury	Guernsey	808	3	1	27–5–25	273	4,923	7·02	345·70	16	Gay Lad's Golden Dawn of Guildford, 162.
Daisy 3rd of Garden Hill	D. Malcolm	Jersey	16852	3	4	20–9–25	180	4,305	5·48	236·04	18½	Silver King of Banyule, 2500.
Myrtle 12th of Greyleigh	D. Malcolm	I.M.S.	N.Y.A.	3	2	11–3–25	213	5,358	4·31	230·98	6	Foch of Greyleigh.
Fondant 14th of Garden Hill	W. Padbury	Jersey	15681	3	1	10–8–25	60	1,080	7·25	78·39	16½	Cream Socks of Glen Iris.

SENIOR HEIFERS (OVER 2½ YEARS AND UNDER 3 YEARS)—STANDARD 225LBS. BUTTER FAT.

Mokine Columbine 2nd	T. H. Wilding	Jersey	14348	2	8	7–7 25	273	7,266	6·26	455·37	22	Ettie's Chief of Banyule, 1757.
Juliet of Juadine	Walker & Co.	do.	14345	2	8	18–8–25	273	6,394	5·33	341·37	16⅛	Mokine Romeo, 2755.
Madge of Sarnia	D. Malcolm	do.	13437	2	11	24–7–25	240	5,775	5·55	320·73	20½	Obligato's King of Roelands, 2601.
Parson's Red Rose 31st of Wollongbar	Department of Agriculture	Guernsey	985	2	8	6–7 25	273	5,658	5·32	301·52	16	Rose Boy of Wollongbar, 316.
Daisy Rye of Grass Vale	R. H. Rose	Jersey	15688	2	6	24–8–25	273	4,755	5·93	281·98	10	Rye Duke of Glen Iris, 1994
Countess 6th of Berry	R. Smith	M.S.	N.Y.A.	2	11	1–1–27	273	6,078	4·05	246·34	21	Melba's Emblem of Darbalara, 461.
Blue Bell II. of Cowra	do.	do.	N.Y.A.	2	9	13–12–24	273	5,690	4·21	239·56	21½	Newhaven of Darbalara, 1174.
Primula II. of Berry	do.	do.	N.Y.A.	2	6	14–12–24	273	4,615	4·47	206·61	8½	Rutland of Darbalara, 575.
Fancy Rye of Grass Vale	R. H. Rose	Jersey	15689	2	8	26–8–25	273	3,465	5·87	203·66	5	Rye Duke of Glen Iris, 1994.

HERD TESTING—*continued.*

Name of Cow.	Owner.	Breed.	Herd Book No.	Age.	Date of Calving.	No. of Days in Test.	Weight of Milk for Period.	Average Test.	Total Butter Fat.	Weight of Milk Last day of Test.	Sire.
				yrs. mth.			lbs.	%	lbs.	lbs.	
JUNIOR HEIFERS (UNDER 2½ YEARS)—STANDARD, 200LBS. BUTTER FAT.											
Gibson Girl 9th of Berry	R. Smith	M.S. ...	N.Y.A.	2 5	4-3-25	273	8,050	4·11	331·40	28½	Melba's Emblem of Darbalara, 461.
Peree's Rye of Grass Vale	R. H. Rose ...	Jersey ...	15699	2 0	11-8-25	273	5,997	5·49	329·74	14	Rye Duke of Glen Iris, 1994.
Rose of Waterside	Wooroloo Sanatorium	M.S. ...	N.Y.A.	2 4	9-11-24	283	6,131	4·58	281·38	15½	Premier of Mayfield, 511.
Myrtle of Cowra	R. Smith	do. ...	N.Y.A.	2 0	27-12-24	273	6,300	4·36	274·64	20	Newhaven of Darbalara 1124.
Peerless Lily of Juadine	Walker & Co. ...	Jersey ...	14347	2 4	30-5-25	273	4,837	5·62	272·76	16½	Peerless of Garden Hill, 2010.
Butterfly of Waterside	Wooroloo Sanatorium	M.S. ...	N.Y.A.	2 2	29-11-24	273	6,142	4·43	272·23	17½	Premier of Mayfield, 511.
Bonnet II. of Berry	R. Smith	do. ...	N.Y.A.	2 3	22-12-24	273	5,642	4·79	270·69	20	Newhaven of Darbalara, 1174.
Pretty Polly II. of Cowra	do.	do. ...	N.Y.A.	2 5	1-1-25	273	5,675	4·55	258·31	21½	Newhaven of Darbalara, 1174.
Daisy Belle of Koojan	A. W. Padbury ...	Guernsey ...	824	2 1	4-7-25	273	4,300	5·60	240·81	13½	Gay Lad's Golden Rule, 247.
Daisy of Koojan	do.	do. ...	825	2 3	18-6-25	273	4,378	5·49	240·62	14½	Renown of Koojan, 414.
Joan of Koojan	do.	do. ...	829	2 3	7-6-25	213	4,756	4·98	236·98	15½	Renown of Koojan, 414.
Topsy Rye of Grass Vale	R. H. Rose ...	Jersey ...	15702	2 5	17-9-25	210	3,960	5·81	230·25	11½	Rye Duke of Glen Iris, 1994.
Daisy Rye of Grass Vale	do.	do. ...	15688	1 8	23-10-24	273	3,741	5·51	206·15	12	Rye Duke of Glen Iris, 1994.
Rye Bread of Grass Vale	do.	do. ...	15700	2 5	8-8-25	273	4,044	5·03	203·70	8	Rye Duke of Glen Iris, 1994.
Wooroloo Pride, 1st	Wooroloo Sanatorium	M.S. ...	N.Y.A.	2 4	12-8-25	273	5,125	3·95	202·43	18½	
Ladybird of Grass Vale	R. H. Rose ...	Jersey ...	15695	2 5	11-8-25	213	3,226	6·25	201·68	5½	Rye Duke of Glen Iris, 1994.
Maderia of Sarnia	D. Malcolm ...	do. ...	15678	2 0	2-8-25	240	3,060	5·60	173·49	10	Obligato's King of Roelands, 2601.
Sunlight of Waterside	Wooroloo Sanatorium	M.S. ...	N.Y.A.	2 2	24-12-24	273	3,510	4·53	159·14	10	Masher of Mayfield, 1135.
Treasure of Sarnia	D. Malcolm ...	M.S ...	N.Y.A.	2 4	30-1-25	273	3,826	4·13	158·20	9½	Duke of Homeleigh,
Carnation of Koojan	A. W. Padbury ...	Guernsey ...	814	2 3	16-6-25	120	1,515	5·94	91·09	9½	Renown of Koojan, 414.

THE OBJECTS AND CONDITIONS OF FARMERS' TRIALS.

Geo. L. Sutton.
Director of Agriculture.

For five years the Department of Agriculture has been carrying out trials on farmers' holdings. During the first year they were confined to the wheat belt and to trials with wheat and oats on light land, but since then their scope has been extended so that trials have been conducted throughout the agricultural area and on all kinds of soil.

All kinds of experiments are not suitable for the farmers to carry out. A farmer is a commercial man engaged in a business for the profit there is in it, and all experiments are not directly profitable; therefore, any experiment carried out by a farmer, except in a public spirited way, must be of such a character that the experiment is of special interest and that the results will be of *direct* benefit to him. Unless this be so the experiment may be neglected on some occasion when it interferes with some of his multitudinous duties which are directly profitable. Willing acknowledgment is made of the public-spirited attitude of farmers in Western Australia who have undertaken experiments in the interest of their district rather than of special value to themselves, but the general principle underlying these trials is that they are of benefit to the experimenter himself as well as to his district.

One of the objects which the departmental officer has in visiting the applicant for these trials is to ascertain what problems are of special interest to him, with a view to solving them and planning the trial to suit the implements and other conditions obtaining on the farm. For example, in the wheat belt it has been found that the size of the plot most suited for the implements—particularly the drill—in use ranges from a quarter to half an acre. In the South-West dairy belt the plots are smaller.

Typical trials of direct value to the wheat farmer are variety trials whereby he can determine with some degree of accuracy whether a new variety of wheat or oats is more suitable for his requirements than his old favourites, or this simple trial may be slightly elaborated so that he may determine which type of wheat or oats is most suitable for his conditions.

A typical trial of direct value to the dairy farmer is a fodder trial to determine, say, whether Sudan grass or maize is most prolific or otherwise more suitable for his conditions.

Experiment work requires a certain amount of additional care and labour. The experience of the Department over a number of years has, however, reduced this to a minimum, and with the assistance rendered by the supervisor in laying out the plots the extra work devolving upon the farmer is not very great and is felt principally at harvest time when the different plots require to be dealt with separately.

Any farmer desirous of having any trial carried out on his holding is requested to make application to the Director of Agriculture, Perth, giving details regarding the problems of interest as well as concerning the location,

character, and condition of the land. Because of the public interest which attaches to any of these experiments it is desirable that where possible the land on which they are planted should be easily accessible.

In the wheat belt proper one of the essential conditions is that the experiments shall be on properly fallowed land; and in this area it is desired that the applications be sent in early. The closing date for applications is 1st August, 1926.

The conditions under which farmers' trials are conducted are as follows:

1. The Department of Agriculture will send an officer—
   (a) to visit the district;
   (b) to ascertain the type of trial to suit the need of the individual case;
   (c) to select the location on which the trial is to be carried out;
   (d) to arrange details relating to the conduct of the trial;
   (e) to assist in laying out the plots, assist in the planting and supervise the same.
2. The Department will supply—
   (a) seed of varieties in the variety trials other than the control varieties;
   (b) when desired the seed required for Rate of Seeding and Rate of Superphosphate trials;
   (c) the fertilisers other than superphosphate required in the fertiliser trials;
   (d) the necessary plot labels.
3. The whole of the produce from the trial plots will be the property of the farmer.
4. The farmer will be required to provide the land, and transport the Supervising Officer from and to the railway station.
5. The farmer will be required to carry out the work of preparing the land, and the sowing, cultivation and harvesting, with his own labour and implements, according to instructions supplied by the Department.

HORTICULTURAL NOTES.

SEASONAL WORK FOR JULY, AUGUST AND SEPTEMBER.

Geo. W. Wickens,
Officer in Charge Fruit Industry.

July.

In deciduous orchards fruit picking finishes up for the season in early June, when the last of the "Yates," "Dougherty," and "Rokewood" apples are gathered, and growers are then able to push on with pruning operations which must be continued during July.

To anyone interested in horticulture, but particularly to those whose livelihood depends upon the quantity and quality of fruit produced, there is no other orchard task throughout the year which is as interesting as pruning. Each year the results of previous year's operations can be noted, past errors corrected as far as possible, and satisfaction felt when the tree is seen to have responded to the treatment given by the skilful operator. I am, of course, referring to pruning which is intelligently performed, and where no cut is given without a reason; not to that type of tree disfigurement which sometimes masquerades under the name of pruning, and which mainly comprises indiscriminate cutting back of young growths with an occasional sawing out of a limb: the latter apparently with the idea of imparting a finish to the job.

Anyone who masters the principles underlying the practice of pruning and carefully notes the result of each year's work, will soon become efficient, and not only experience the joy which is always found in work well done, but reap profit as well.

To those who are beginners, and there are a number of these in the new settlements in the South-West, as well as to older growers who are dissatisfied with their efforts to "train up a plant in the way it should grow," I strongly advise communicating with their district orchard inspector, asking for his advice and a practical demonstration. These are always obtainable and will save many mistakes being made and future losses incurred.

Provided the land is not too wet and sticky, July is one of the best months for planting out deciduous trees. Care must be exercised when the young plants are received from the nurseries to carefully heel them in so that the air does not dry the moisture out of the roots. Provided this is done the trees will not be injured if planting cannot be proceeded with for a few weeks after the trees arrive.

Citrus growers, particularly those who produce navel oranges, will be busy harvesting their crop during this month. At time of writing—middle of May—it is impossible to say whether any oranges will be exported to London this season. Earlier in the year tentative inquiries were being made by shipping agents, and growers hoped the F.O.R. sales, which were so satis-

factory last year, would again materialise. Unfortunately, before anything was finalised the strike occurred in Great Britain and negotiations ceased. With the settlement of the strike and the return to normal conditions in England, it is hoped that a market for some of our oranges will be found there, for if the whole of the crop has to be disposed of locally, growers will receive very low returns.

If the first spraying of deciduous trees for San José Scale has not yet been done, it should be done at once. San José Scale *can be* controlled, and growers only have themselves to blame when their fruit is stopped from export owing to the presence of the disease.

Fruit fly traps should be in use now in all orchards where there are citrus or other fruits likely to attract the pest. Baiting trees is not as effective in the winter as in summer, owing to rain washing the bait from the leaves, but an immense amount of good can be done by using traps if they are frequently cleaned out and replenished with bait. It must be remembered that one fly killed during the winter season is worth as much as many hundreds destroyed in summer.

One of the most careful and observant growers in the Hills district (Mr. Annetts) this year discovered that some of the flies which he was emptying out of his traps on to the ground, and which were apparently dead, revived in the sun's warmth, and flew away unharmed. To prevent this from happening all captured flies should be emptied from the traps into a vessel that can be carried to a fire for boiling, or the vessel should contain water covered with a film of kerosene.

August.

Winter pruning should be finished this month, although some of the later blooming kinds of apple and pear trees can be pruned as late as the second week in September. It is very inadvisable, however, to run winter pruning on into September, not that the late blooming varieties mentioned above would suffer from the operation, but September is the commencement of Spring, and Spring brings its own duties which should not be hindered in accomplishment by a carry-over of winter work.

Planting deciduous (not citrus) trees should also be finished this month.

Scions for grafting should be cut from the trees this month and buried in soil in a cool place so that the buds will remain dormant until after grafting is done in September.

The second spraying for San José Scale should be applied before the end of this month to all trees on which the buds are forward. Late blooming kinds can be sprayed in September with winter strength solutions.

Citrus trees should be carefully watched for Aphis, and Black Leaf 40 brought into use if the insects are plentiful.

Fruit fly traps should be in continual use and frequently cleaned out and replenished.

September.

Ploughing should be completed early in this month, and the cultivators and hoes brought into use. Our winter rainfall is abundant, our summer rains meagre, and thorough cultivation is essential to retain sufficient moisture in the soil to enable the trees to mature a crop of fruit.

Pear trees should be sprayed this month in the "pinking stage" with Bordeaux Mixture to control Black Spot, using 6lbs. bluestone, 4lbs. lime in 50 gallons of water, or Burgundy Mixture, using 6lbs. bluestone, 8lbs. washing soda in 50 gallons of water.

Where apple trees are affected with Powdery Mildew they should be sprayed with Atomic Sulphur at a strength of 1lb. of atomic sulphur in 8 gallons of water as soon as the young fruit has formed.

Where citrus trees are infested with aphis, continue spraying with tobacco extract and soap.

Continue trapping fruit flies and also use foliage bait on all trees where the fruit is in a stage of ripeness which will allow the female fly to deposit her eggs therein.

Loquats and oranges require very careful attention so as to prevent them from carrying the pest forward to the summer fruits.

The planting of citrus trees should be completed this month.

Graft over all old obsolete varieties of apple and pear trees. Use the strap graft, and, if not familiar with it, ask the district orchard inspector for a demonstration.



FARMERS' FIELD TRIALS.

H. RUDALL,
Field Officer.

The Farmers' Field Trials carried out during the 1925 season were rates of seeding with wheat, and variety tests with wheat and oats. The wheat variety trials were conducted at Bencubbin, Gutha, Welbungin, Graball, Yandanooka, and Southern Cross.

The oat variety trials were at Bencubbin and Gutha. The rate of seeding trial was at Yandanooka.

The total number of plots at each centre varied from 16 to 6.



Bird's eye view Farmers' Trials, Bencubbin.

Except in the trials at Gutha where the area of each plot was .4 acre, the acreage of the plots was half an acre. At all centres each experiment was planted in duplicate. In the wheat variety trials comparisons were made with Federation and Nabawa as midseason varieties, and Gluyas Early and Merredin as early varieties. At Gutha, Welbungin, Graball, and Southern Cross the check or control plots were planted with "Bald Early," "Caliph," and "Canberra" varieties respectively.

In the oat variety trials the comparisons were between "Wilga" and "Guyra" as midseason varieties, and "Burt's Early" and "Mulga" as early varieties.

All the plots, except those at Southern Cross, were sown on well-worked fallowed land, and fortunately heavy rains that fell in the Eastern areas during the fallow period provided a good reserve of moisture in the soil, which enabled the crops to return the satisfactory yield during what was termed a dry season, not so much owing to the low annual rainfall but in spite of the very poor distribution of the rains during the growing period.

CULTURAL NOTES.

The details of the cultivation of the plots at the different centres are:—

Welbungin.—W. Bagshaw: Ploughed July, 1924; cultivated September and November, 1924, February and April, 1925; sown 2nd May with 45 lbs. seed and 85 lbs. super. per acre.

Bencubbin.—B. W. Hopwood: Wheat and oats, ploughed July, 1924; cultivated (Springtyne), September; Sundercutted, October; Springtyned, February, 1925; harrowed, March; Sundercutted, April; harrowed again prior to seeding on 4th and 5th May. Sown with 45 lbs. seed and 100 lbs. super per acre. Oats 40 lbs. seed and 100 lbs. super.

Graball.—J. Hall: Ploughed August, 1924; cultivated September, 1924, March and April, 1925. Sown 24th April with 45 lbs. seed and 100 bs. super. per acre.

Gutha.—W. J. Eva: Wheat and oats, ploughed August, 1924; cultivated late September, 1924, with Springtyne, and 20th April, 1925, with Springtyne. Sown 29th April with 45 lbs. seed and 100 lbs. super. per acre. Oats 40 lbs. seed and 100 lbs. super. per acre.

Yandanooka.—D. Hehir: Ploughed in September, 1924; disc cultivated in February, 1925; harrowed April, and sown 10th May with 45 lbs. seed and 80 lbs. super. per acre. Nabawa was used in the rate of super. experiment.

Southern Cross.—E. H. Richards: Ploughed 25th February, 1925, after heavy rain; cultivated 2nd and 22nd March; harrowed 15th April; planted 22nd April with 45 lbs. seed and 75 lbs. super. per acre.

In order to show the relations between the rainfall during growing period and yield, the average yield of all varieties at each locality is included with the rainfall for the same centres in the table below.

OFFICIAL RAINFALLS AND AVERAGE YIELDS.

District.	Jan.	Feb.	Mar.	Apl.	Growing Period.						Total.	Average Yield per acre.	
					May	June.	July.	Aug.	Sept.	Oct.			
												bus.	lb
Bencubbin ...	470	90	166	32	109	88	177	14	92	40	520	21	27
Gutha	247	95	281	5	142	321	175	97	197	53	985	14	53
Graball	191	145	34	28	149	281	154	18	121	41	764	16	25
Welbungin ...	177	75	244	...	66	143	183	68	117	53	630	12	10
Yandanooka ...	146	14	...	...	278	451	257	93	232	46	1,357	23	58
Southern Cross	204	199	77	32	90	76	100	50	85	58	459	...	

At Southern Cross the unfallowed land was not ploughed until late in February after a very heavy rain of over two inches.

Further lighter falls fell during March when light cultivations were made. Seeding was completed on the 22nd April. Germination was good, and in July the plots looked very promising. From then on the plots started to show signs of suffering, and a glance at the rainfall table will show that all forward growth had been on surface moisture. At the end of October I saw the plots were not worth stripping for comparison purposes.

THE SEASON.

The 1925 wheat season cannot be regarded as a favourable one. During June and July, which is usually the rainy season, the precipitation was much below the average, and the deficiency was more pronounced for the month of August and the first two weeks in September (six weeks' drought).

The lack of rain during the spring had a deprecating influence on the ultimate returns. Despite this, it will be noted that at Bencubbin an average yield was almost 21½ bushels per acre, notwithstanding the low rainfall during the growing period of just over five inches.

The results obtained in the different trials, and from which comparisons can be made, are hereunder:—

VARIETY TRIALS—WHEAT.

Farmer.	District.	Type of Soil.	Merredin.	Gluyas Early.	Nabawa.	Federation.	Control Plots.	
							Yield.	Variety.
			bs. lb.	bs. lb.	bs. lb.	bs. lb.	bs. lb.	
J. Hall ...	Graball ...	Light mallee	16 28	16 41	...	...	16 5	Newman's Early.
W. J. Eva ...	Gutha ...	Light to medium red loam	...	...	17 30	11 50	15 20	Bald Early.
D. Hehir ...	Yandanooka...	Medium clay loam	26 36	21 20	...	...	...	
W. Bagshaw	Welbungin ...	Clay loam ...	11 0	14 0	...	...	11 30	Caliph.
B. H. Hopwood	Bencubbin ...	Light friable loam	20 43	21 36	23 3	20 25	...	

The Newman's Early plots were badly attacked by rabbits.

Gluyas Early lodged badly at Yandanooka.

VARIETY TRIALS—OATS.

Farmer.	District.	Type of Soil.	Burt's Early.		Mulga.		Wilga.		Guyra.	
			bus.	lbs.	bus.	lbs.	bus.	lbs.	bus.	lbs.
B. W. Hopwood	Bencubbin ...	Light friable loam	26	21	27	10	24	0	36	3
W. J. Eva ...	Gutha	Light medium red loam	24	15	32	26	31	10	22	3

RATE OF SEEDING EXPERIMENT.

VARIETY—NABAWA—D. HEHIR, YANDANOOKA.

Rate of Seed.	Type of Soil.	Yield per acre.	
		bus.	lbs.
45lbs.	Medium clay loam	22	1
60lbs.	do.	25	42
90lbs.	do.	25	29

The yield on the plot sown at the rate of 45 lbs. was reduced on account of the growth of natural grasses.



Oat Variety Trial at W. J. Eva's Farm, Gutha. (Mulga variety.)



Oat Variety Trial at W. J. Eva's Farm, Gutha. (Wilga variety.)

FERTILISER EXPERIMENTS WITH POTATOES AT YOUNG'S SIDING.

G. N. LOWE,
Senior Potato Inspector.

Summer Planted Crop, 1926.

An experiment with the object of determining the composition of a fertiliser for potatoes in peat soils in the Albany district has been concluded on the farm of Mr. T. H. Tonkin at Young's Siding, on the Denmark Line.

It is not always recognised that the largest crop possible by manuring may at the same time not necessarily be the most profitable.

The cost of an excess of fertiliser unsuitably compounded may be of much less value than the cost of the additional fertiliser used.

The principal object of these experiments is to ascertain the composition of the most economical potato fertiliser for use in the district in which such tests are made.

A properly-balanced fertiliser for potatoes is just as essential as a properly-balanced ration for a dairy cow, though often this is not recognised.

The coastal swamp lands in the Young's Siding district are of deep easily worked peat, well adapted to the cultivation of the potato and probably well supplied in nitrogen, but low in phosphoric acid and potash.

The land made available was typical of the bulk of the swamps in the district and of good average quality.

Control plots, in which a high quality complete fertiliser was used, were the basis of comparison, with the intervening plots composed to ascertain—

1. The effect of reducing the application of nitrogen.
2. The effect of applying nitrate of soda as the source of nitrogen.
3. The effect of reducing the quantity of soluble phosphoric acid.
4. The effect of the absence of potash.

Two further plots were included to afford—

5. A comparison of seed from Benger Swamp as a change.
6. A comparison, with Delaware, of a pink variety similar to Brounell's Beauty in appearance, the actual name of the variety being unknown.

This potato had yielded particularly well in a previous crop, and as a matter of interest to local growers it was decided to further test it.

The plan of the experiment showing the quantity of plant food per acre, how it was derived, together with the application of fertiliser per plot and the order in which they were planted is shown below:—

POTATO FERTILISER TRIAL, 1925–26.

YOUNG'S SIDING (SUMMER CROP).

Rows planted 30ins. apart by 5 chains long, equalling 1/50th acre.

Plot.		Plant Food per acre.	Manuring per acre	Manuring per plot 1/50th acre.
		lbs.		
1 Control.	Nitrogen	100	500lbs. Sulphate Ammonia	10lbs. Sulphate Ammonia.
	Phosphoric Acid ...	300	1,430 ,, Superphosphate	28½ ,, Superphosphate.
	Potash	100	210 ,, Sulphate Potash	4 ,, Sulphate Potash.
2	Nitrogen	70	350lbs. Sulphate Ammonia	7 lbs. Sulphate Ammonia.
	Phosphoric Acid ...	300	1,430 ,, Superphosphate	28½ ,, Superphosphate.
	Potash	100	210 ,, Sulphate Potash	4 ,, Sulphate Potash.
3	Nitrogen	40	200lbs. Sulphate Ammonia	4lbs. Sulphate Ammonia.
	Phosphoric Acid ...	300	1,430 ,, Superphosphate	28½ ,, Superphosphate.
	Potash	100	210 ,, Sulphate Potash	4 ,, Sulphate Potash.
4	Nitrogen	100	645lbs. Sodium Nitrate	13 lbs. Sodium Nitrate.
	Phosphoric Acid ...	300	1,430 ,, Superphosphate	28½ ,, Superphosphate.
	Potash	100	210 ,, Sulphate Potash	4 ,, Sulphate Potash.
5 Control	Nitrogen	100	500lbs. Sulphate Ammonia	10 lbs. Sulphate Ammonia.
	Phosphoric Acid ...	300	1,430 ,, Superphosphate	28½ ,, Superphosphate.
	Potash	100	210 ,, Sulphate Potash	4 ,, Sulphate Potash.
6	Nitrogen	100	500lbs. Sulphate Ammonia	10 lbs. Sulphate Ammonia.
	Phosphoric Acid ...	200	950 ,, Superphosphate	19 ,, Superphosphate.
	Potash	100	210 ,, Sulphate Potash	4 ,, Sulphate Potash.
7	Nitrogen	100	500lbs. Sulphate Ammonia	10 lbs. Sulphate Ammonia.
	Phosphoric Acid ...	100	475 ,, Superphosphate	9½ ,, Superphosphate.
	Potash	100	210 ,, Sulphate Potash	4 ,, Sulphate Potash.
8 Control	Nitrogen	100	500lbs. Sulphate Ammonia	10 lbs. Sulphate Ammonia.
	Phosphoric Acid ...	300	1,430 ,, Superphosphate	28½ ,, Superphosphate.
	Potash	100	210 ,, Sulphate Potash	4 ,, Sulphate Potash.
9	Nitrogen	100	500lbs. Sulphate Ammonia	10lbs. Sulphate Ammonia.
	Phosphoric Acid ...	300	1,430 ,, Superphosphate	28½ ,, Superphosphate.
	Potash	...	No Potash	
10	Nitrogen	100	500lbs. Sulphate Ammonia	10 lbs. Sulphate Ammonia.
	Phosphoric Acid ...	300	1,430 ,, Superphosphate	28½ ,, Superphosphate.
	Potash	200	415 ,, Sulphate Potash	18½ ,, Sulphate Potash.
11	Nitrogen	100	500lbs. Sulphate Ammonia	10 lbs. Sulphate Ammonia.
	Phosphoric Acid ...	300	1,430 ,, Superphosphate	28½ ,, Superphosphate.
	Potash	300	625 ,, Sulphate Potash	12½ ,, Sulphate Potash.
12 Control	Nitrogen	100	500lbs. Sulphate Ammonia	10 lbs. Sulphate Ammonia
	Phosphoric Acid ...	300	1,430 ,, Superphosphate	28½ ,, Superphosphate.
	Potash	100	210 ,, Sulphate Potash	4 ,, Sulphate Potash.
13 Variety Trial	Nitrogen	100	500lbs. Sulphate Ammonia	10 lbs. Sulphate Ammonia.
	Phosphoric Acid ...	300	1,430 ,, Superphosphate	28½ ,, Superphosphate.
	Potash	100	210 ,, Sulphate Potash	4 ,, Sulphate Potash.
	This plot planted with selected Bengler "Delaware" large cut.			
14 Variety Trial	Nitrogen	100	500lbs. Sulphate Ammonia	10 lbs. Sulphate Ammonia.
	Phosphoric Acid ...	300	1,430 ,, Superphosphate	28½ ,, Superphosphate.
	Potash	100	210 ,, Sulphate Potash	4 ,, Sulphate Potash.
	This plot planted with variety similar to "Brownell's Beauty" large cut.			

The experiment was planted on 11th November and harvested by hand in the usual way on 11th March, the potatoes then being thoroughly mature.

The weather during planting was cool and the land in excellent tilth and fine moist condition.

The rainfall during the period of the experiment was considered normal at Young's Siding where, however, no registrations were kept.

Figures available show that at Denmark in the West, 704 points fell, and at Albany to the East, 710 points were registered; whilst at Torbay, a few miles away, 1,005 points were recorded during the period.

The seed used was "Delaware," grown by Mr. Tonkin from supplies obtained originally from the Brunswick State Farm some eight or nine years ago.

Proper care has been exercised in selection since, and the strain has been retained in an unusual degree as to purity and trueness to type.

As a change this seed has been grown on limestone country on the Kalgan River and this is apparently beneficial, although not so complete a change or as successful as seed from Benger Swamp, as results in Plot 13 would indicate.

The seed was planted at the rate of 10 cwt. per acre. The whole of it was sprouted and cut prior to planting.

After cutting into trays the seed was covered with wet bags until planting the following day, this treatment being decided upon as the result of a recent English experiment, which is described in another article in this issue.

In view of the contention of numerous growers in the Albany-Denmark district that cut seed will not give a proper germination it is interesting to note that in this case it was practically 100 per cent. This phase of seed treatment will be further tested later.

A method of planting largely followed in the district is that of ridging with the double-breasted plough. As Mr. Tonkin has himself adopted this system in the past the experiment was planted in this manner, although it is a moot point as to whether this has any advantage over that of flat planting which is general in the South-West. Indeed, the heaviest crop in the Young's Siding district was planted according to the latter method.

Considerable discussion was aroused in the locality of the experimental plot over the width of planting, viz., 30 inches between rows and 18 inches between "sets." It was asserted by some of the growers that four feet to four feet six inches by two feet was the correct spacing, because with the closer measurements the plants from one row would encroach on those in the next and also that the size of the tubers would be greatly restricted. However, neither of these contentions was borne out.

The very wide planting certainly appears to be a waste of excellent soil, and is aggravated by the effect of heavy winds which often prevail in the district during the summer. When grown at such intervals the plants are afforded no protection by the neighbouring rows as when the spacing is reasonably close.

The results of the Nitrogen, Phosphoric Acid, and Potash Series are shown in that order, and may be followed more easily by referring to the percentage yields. The yields obtained in Section 1 were:—

Plots.	Fertiliser per acre.	Computed Yields per acre.				Per centage Yield.
		1st Section 1/100 acre.	2nd Section 1/100 acre.	Average.	Natural.	
		T. C. Q. LBS.	T. C. Q. LBS.	T. C. Q. LBS.	T. C. Q. LBS.	
1 Control	500lbs. Sulphate Ammonia 1,430 ,, Superphosphate ... 210 ,, Sulphate Potash ...	10 4 1 24	6 19 1 4	8 12 1 8	8 12 1 8	100
2	350lbs. Sulphate Ammonia 1,430 ,, Superphosphate ... 210 ,, Sulphate Potash ...	9 14 2 16	7 18 3 20	8 16 3 4	8 18 2 8	99
3	200lbs. Sulphate Ammonia 1,430 ,, Superphosphate ... 210 ,, Sulphate Potash ...	9 12 3 12	8 7 3 12	9 0 1 12	9 3 3 20	98
4	645lbs. Sodium Nitrate ... 1,430 ,, Superphosphate ... 210 ,, Sulphate Potash ...	6 18 1 16	5 7 0 16	6 3 0 24	9 10 0 20	65
5 Control	500lbs. Sulphate Ammonia 1,430 ,, Superphosphate ... 210 ,, Sulphate Potash ...	10 0 3 16	9 10 0 20	9 15 2 4	9 15 2 4	100

The outstandnig feature in this series is Plot 4, which shows that sodium nitrate as a source of nitrogen applied in the furrow is not a success, and as this bears out previous experience it is proposed to exclude it from future tests.

The difference between the results in Plots 2 and 3 would indicate that the smaller quantity of nitrogen as supplied by lower weights of sulphate of ammonia is adequate. It is possible that even this is excessive, and in order to test whether this component may not be further reduced and the necessary nitrogen supplied in its cheapest form (that is, by means of a leguminous crop ploughed under) arrangements have been made with Mr. Tonkin to plant a portion of the land for next year's trial with such a crop.

The yields in Section 2 are:—

Plots.	Fertilisers per acre.	Computed Yields per acre.				Per centage Yield.
		1st Section 1/100 acre.	2nd Section 1/100 acre.	Average.	Natural.	
		T. C. Q. LBS.	T. C. Q. LBS.	T. Q. C. LBS.	T. C. Q. LBS.	
5 Control	500lbs. Sulphate Ammonia 1,430 .. Superphosphate ... 210 ,, Sulphate Potash ...	10 0 3 16	9 10 0 20	9 15 2 4	9 15 2 4	100
6	500lbs. Sulphate Ammonia 950 ,, Superphosphate ... 210 ,, Sulphate Potash ...	8 4 1 4	9 3 3 20	8 14 0 12	9 15 2 4	89
7	500lbs. Sulphate Ammonia 475 ,, Superphosphate ... 210 ,, Sulphate Potash ...	6 2 1 8	7 4 2 16	6 13 3 20	9 16 1 20	71
8 Control	500 Sulphate Ammonia 1,430 ,, Superphosphate ... 210 ,, Sulphate Potash ...	9 18 0 24	9 14 2 16	9 16 1 20	9 16 1 20	100

It is noticeable in this section that with the reduction of phosphoric acid supplied in the superphosphate that the yield is reduced considerably.

Comparing the result in the Control Plot (No. 5) and that in No. 7, it will be noted that the yield in favour of the control amounts to 29 per cent.

The yields in Section 3 are:—

Plots.	Fertilisers per acre.	Computed Yields per acre.				Per centage Yield.
		1st Section 1/100 acre.	2nd Section 1/100 acre.	Average.	Natural.	
		T. C. Q. LBS.	T. C. Q. LBS.	T. C. Q. LBS.	T. C. Q. LBS.	
8 Control	500lbs. Sulphate Ammonia 1,430 ,, Superphosphate ... 210 ,, Sulphate Potash ...	9 18 0 24	9 14 2 16	9 16 1 20	9 16 1 20	100
9	500lbs. Sulphate Ammonia 1,430 ,, Superphosphate ... No Potash	8 17 2 20	7 19 3 8	8 8 3 0	9 11 3 24	88
10	500lbs. Sulphate Ammonia 1,430 ,, Superphosphate ... 415 ,, Sulphate Potash ...	9 13 3 0	10 9 3 8	10 1 3 4	9 7 2 0	108
11	500lbs. Sulphate Ammonia 1,430 ,, Superphosphate ... 625 ,, Sulphate Potash ...	9 17 1 8	10 0 3 16	9 19 0 12	9 3 0 4	109
12 Control	500lbs. Sulphate Ammonia 1,430 ,, Superphosphate ... 210 ,, Sulphate Potash ...	9 14 2 16	8 2 2 0	8 18 2 8	8 18 2 8	100

In this section a gain in yield is noticeable with the application of sulphate of potash up to 415 lbs. (200 lbs. of pure potash) per acre in Plot 10. A slight increase occurs in Plot 11, with an application of 625 lbs. per acre, but this is so slight as to be negligible, but would indicate that no gain may be looked for in yield from dressings heavier than that in Plot 10.

It may be accepted, that in peat soils such as these, that potash is a necessary component of fertilisers for potatoes, and should also improve the quality or starch bearing property of the tubers. This phase is also being investigated from the standpoint of chemical analysis with potatoes drawn from the experiment.

Change of Seed Trial : Plots 12 *(Control) and* 13.

Plots.	Fertilisers per acre.	Computed Yields per acre.				Per centage Yield.
		1st Section 1/100 acre.	2nd Section 1/100 acre.	Average.	Natural.	
		T. C. Q. LBS.	T. C. Q. LBS.	T. C. Q. LBS.	T. C. Q. LBS.	
12 Control	500lbs. Sulphate Ammonia 1,430 ,, Superphosphate ... 210 ,, Sulphate Potash ...	9 14 2 16	8 2 2 0	8 18 2 8	8 18 2 8	100
13	500lbs. Sulphate Ammonia 1,430 ,, Superphosphate ... 210 ,, Sulphate Potash ...	14 9 1 6	10 19 2 16	12 11 3 4	8 18 2 8	143
	(This plot planted	with graded	Benger "Del	aware"— lar	ge cut.)	

This portion of the trial was designed to test whether seed of the same variety ("Delaware") from Benger Swamp would influence the yield, as it is known throughout the other potato districts that this is so, provided seed of good strain be obtained.

This seed was composed of well-graded shapely tubers of about 10 to 12 ounces each and cut into "sets" of about three ounces and planted with the fertiliser used in the control and at the same rate.

Any marked difference in yield under these conditions could then be attributed to the difference in the seed.

Indications certainly point to this change of seed being most desirable.

Variety Trial: *Plots* 12 (*Control*) *and* 14.

Plots.	Fertiliser per acre.	Computed Yields per acre.				Per centage Yield.
		1st Section 1/100 acre.	2nd Section 1/100 acre.	Average.	Natural.	
		T. C. Q. LBS.	T. C. Q. LBS.	T. C. Q. LBS.	T. C. Q. LBS.	
12 Control	500lbs. Sulphate Ammonia 1,430 ,, Superphosphate ... 210 ,, Sulphate Potash ...	9 14 2 16	8 2 2 0	8 18 2 8	8 18 2 8	100
14	500lbs. Sulphate Ammonia 1,430 ,, Superphosphate ... 210 ,, Sulphate Potash ...	6 12 0 16	4 7 2 0	5 9 3 8	8 18 2 8	62
	Planted with variety similar in appearance to "Brounell's Beauty."					

This potato apparently is not "Brounell's Beauty," as it ripened fully in 10 weeks, and is of dwarf habit.

The yield was poor, and coupled with the fact that the number of small tubers was excessive and the large ones showed "hollow heart," the variety is undesirable.

Summary.

The tentative inferences which may be drawn from this first experiment then are that:—

1. Comparatively light dressings of sulphate of ammonia as a source of nitrogen are needed in these peat soils, which are rich naturally in this plant food.

2. Nitrate of soda as a source of nitrogen when applied in the furrow at planting is not successful.

3. The crop responds to liberal applications of superphosphate in supplying the requirement of phosphoric acid.

4. The inclusion of potash is beneficial, and should be liberal as might be expected, as peat soils are generally low in this plant food.

5. The change of seed from Benger Swamp, provided it is of good strain, is advantageous.

6. The pink variety similar in appearance to "Brounell's Beauty" does not compare well with "Delaware," either in the matter of yield or general suitability.

THE COOKING OF MEATS.

MISS M. A. WYLIE,
Inspectress and Organiser Domestic Science, Education Department.

FRYING.

A large variety of dishes may be cooked by frying, and, when well done, this is a very satisfactory means of cooking small pieces of meat, fish, batters, and potatoes. When speed is necessary, it is a convenient method, as by it the fibre of food is quickly softened and cooked. A knowledge of a few scientific facts, however, is essential to success. Unless this knowledge is put into practice, failure is inevitable and an indigestible product results.

Frying is boiling in hot fat. Fat is formed of fatty acids and glycerine, the acids varying in the different fats and oils, *e.g.*, the acid of tallow is stearic acid, that of olive and other oils is oleic acid. A simple classification of fats is as follows:—animal fats: tallow, lard, suet; vegetable fats: olive oil, palm and cocoanut oil, and linseed oil; fish oils. For frying, the fat should be clarified, that is, it should be sweet, clean, fresh, and free from salt. If stale, the acid predominates, making it rancid, though the staleness is only due to foreign matter. Salt fat, when used, prevents proper browning. Dripping, skimmings from stock, oil, lard or butter may be rendered fit for cooking. Lard does not give as good a result as beef or mutton dripping, as it so often leaves a coating of fat on the surface of the food. When butter is used, a slow fire is necessary, as it is a substance that heats and burns quickly. Very often, olive oil is used, as many consider it the best of fats for frying. It, also, heats rapidly and therefore requires a slow fire.

Common fats remain solid at the ordinary temperature of air, but melt at about 160 deg. F., and boil at 350 deg.-450 deg. F. When boiling, fat ceases to sizzle and bubble, becoming still with a slight blue fume—not smoke—rising from it. It is the presence of water in fat which causes the bubbling. Water boils at 212 deg. F. . . . . Therefore when the bubbles occur it is merely the water content boiling. When this is evaporated the temperature of the fat rises to its boiling point (350-450 deg. F.).

There are two methods of frying: shallow (often called English frying), and deep, or French frying. Chops, steak, pancakes, liver, eggs, and omelettes may be cooked by the first method; rissoles, fishcakes, doughnuts, potato chips, fish, apple fritters and similar dishes require the second method.

General Directions for Shallow Frying.

1. Place in pan sufficient fat to keep substance from adhering.
2. Heat fat till blue fume rises and surface is still.
3. Lightly and quickly brown substance evenly on both sides (*e.g.*, chops and steaks) to harden surface albumen and so prevent escape of juices.
4. Then cook slowly ten to twelve minutes, turning with a knife.
5. Serve very hot.

Deep Frying—General Directions.

1. Prepare saucepan half full of fat (1-2lbs.), or enough to cover substance to be fried.
2. Heat till blue fume rises and surface is still.
3. Immerse substance, lowering it gently into the fat.
4. Cook till a golden brown; generally requires 3-5 minutes.
5. Drain on crumpled kitchen paper.
6. Serve on paper d'oyley on hot dish. Garnish neatly.
7. Remove fat from fire immediately, strain to be ready for further use.

Food cooked in this way should be protected by means of a covering of egg and bread crumbs, flour, batter, or oatmeal.

Of the two methods, deep frying is easily the more economical, since, though it requires more fat at the time, this can be strained and used again and again. As well, time is saved, as most foods only take three or four minutes to cook thoroughly when treated in this way.

In yet another way deep frying has the advantage over shallow, for, in this latter method, the large amount of water which is contained in the food quickly reduces the temperature of the small amount of fat, causing a semi-steaming and boiling process to ensue. Thus the fat is liable to penetrate the food and form a coating round each fibre, rendering it difficult of digestion; whereas in deep frying the fat, by retaining its temperature (since the water in the food does not so materially affect the larger amount of fat), gives crispness to the protective covering which prevents penetration into the food by the fat.

RECIPES—SHALLOW FRYING.

Liver and Bacon.

1 liver (calf's, lamb's, sheep or ox liver).
¼ to ½ lb. of fat bacon rashers.
1 tablespoonful of flour.
Pepper, salt, dripping.

1. Cut liver into neat pieces, ⅓in. thick.

2. Dip each piece into seasoned flour. This will help to keep in the red juices and prevent the fat from penetrating.

3. Cover bottom of frying pan with dripping (about ¼in. in depth when melted). Bring to boiling (fuming) point, then put in each piece of liver.

4. Fry 5 minutes on one side and 4 on the other.

5. Place in centre of a hot dish and serve with brown gravy and grilled or fried rolls of bacon. Garnish with finely chopped parsley.

Note.—Cut bacon in thin slices, remove rind. Roll up lightly and thread each roll on a skewer. This may be grilled over the fire or cooked in the oven while the liver is being fried.

Fried Cutlets.

Cutlets.
1 egg.
8 tablespoons bread crumbs.
½ teaspoon salt. Pepper.
Dripping.

Method—

1. Trim cutlets, removing skin and gristle. Leave about 2 inches bare bone.
2. Beat egg on plate. Season.
3. Place bread crumbs on kitchen paper.
4. Dip cutlets into eggs and crumbs. Press each cutlet firmly with a knife and shake off loose crumbs.
5. Melt fat in pan and, when fuming hot, put in cutlets. Fry about 10 minutes.
6. Drain cutlets on kitchen paper.
7. Serve on mound or wall of mashed potatoes on hot dish with tomato sauce.

RECIPES—DEEP FRYING.

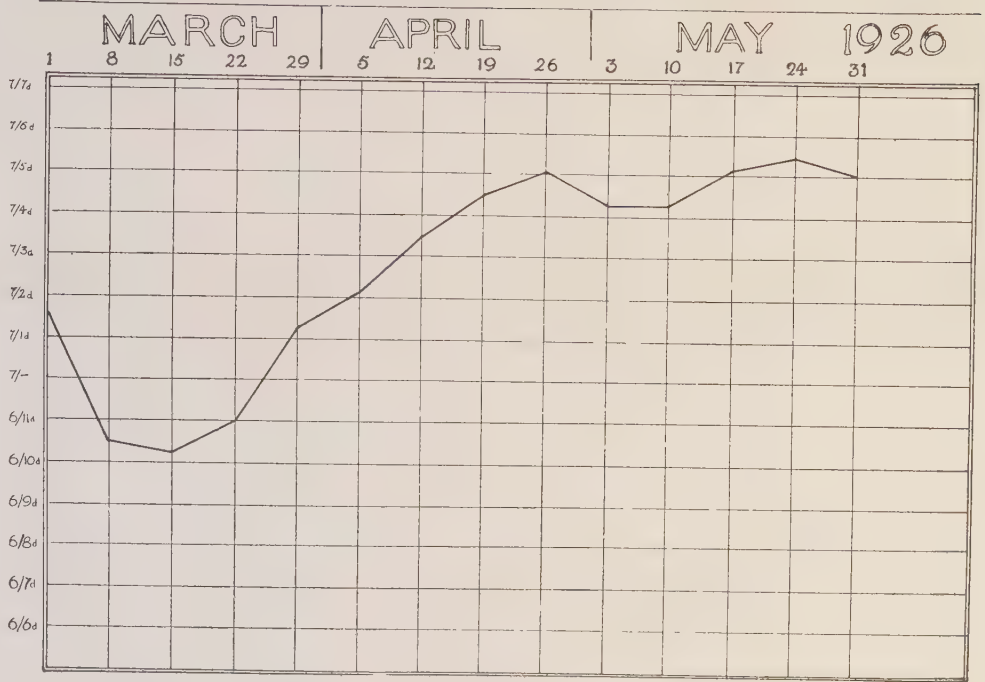
Fish Cakes.

½lb. of cold scraps of fish or tin of salmon.
¼ to ½lb. of cooked potatoes.
1 egg. Bread crumbs.
1 teaspoon chopped parsley.
Salt and pepper.
2 tablespoons of milk or liquor from the fish.
Dripping. Flour.

Method—

1. Remove bones and break fish up finely.
2. Mash and warm potatoes. Add to fish with parsley, pepper, salt. Mix well.
3. Beat egg. Add milk if necessary. Use part of this or liquor from fish to bind the mixture.
4. Divide into even pieces. Mould into shape, using very little flour.
5. Dip in egg and bread crumbs.
6. Fry in deep fat. Drain.
7. Serve on paper d'oyley. Garnish with lemon and parsley.

RETURN OF WHEAT PRICES PER BUSHEL, C.I.F. & E., LONDON.



Compiled from figures kindly supplied by the Co-operative Wheat Pool of Western Australia.

LIVE STOCK AND MEAT.

For the information of readers of the "Journal," the following particulars have been supplied by Messrs. Elder, Smith, & Co., Limited, Perth:—

COMPARATIVE YARDINGS OF STOCK AT METROPOLITAN FAT STOCK MARKETS, DURING MONTHS OF MARCH, APRIL, AND MAY, 1926.

	MARCH.					APRIL.				MAY.			
	3.	10.	17.	24.	31.	7.	14.	21.	28.	5.	12.	19.	26.
Sheep and Lambs	8,874	9,298	11,209	8,201	8,612	7,104	7,750	9,526	10,530	9,451	10,232	9,528	6,584
Cattle ...	692	509	621	584	671	648	845	335	747	391	933	777	784
Pigs ...	973	1,004	788	1,000	713	714	722	851	1,013	646	632	757	684

COMPARATIVE VALUES OF STOCK SOLD AT METROPOLITAN FAT STOCK MARKETS, DURING MONTHS OF MARCH, APRIL, AND MAY, 1926.

	MARCH.					APRIL.				MAY.			
	3.	10.	17.	24.	31.	7.	14.	21.	28.	5.	12.	19.	26.
	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.
Mutton	7½	8	7	7¼	7¾	8	8¼	10	11	11¼	10½	9½	9½
Beef ...	5½	6¼	6¾	7	7	7¼	6	7	6½	6½	6	6	6
Pork ...	10¼	10½	10½	10	10¼	10½	10½	10½	10	9¾	10¼	9¾	9¾
Bacon ...	9½	9¾	9¾	9¼	9¼	9¼	9¼	9¼	9¼	9¾	9¾	9¼	9¼

MARKET REPORT.

The following particulars concerning the various produce markets have been supplied us by Messrs. H. J. Wigmore & Company, Limited, of Wellington Street, Perth.

Chaff.—The undermentioned are quantities of both wheaten and oaten chaff to hand at the metropolitan chaff and grain auction sales:—

March—Quantity, 1,600 tons.
Minimum price for f.a.q. to prime, £6 15s. per ton.
Maximum price for f.a.q. to prime, £7 5s. per ton.

April—Quantity, 1,950 tons.
Minimum price for f.a.q. to prime, £7 per ton.
Maximum price for f.a.q. to prime, £7 7s. 6d. per ton.

May—Quantity, 1,800 tons.
Minimum price for f.a.q. to prime, £7 per ton.
Maximum price for f.a.q. to prime, £7 10s. per ton.

Wheaten Chaff.—In our last report in this Journal it was mentioned that a good demand was setting in from the country for chaff for "seeding" purposes, and that we anticipated a very firm market. Right throughout the period under review the demand from farmers for this purpose was excellent, and with just sufficient supplies arriving to meet the local demands, the market has been very firm.

Supplies of hay in the stack are now getting short, and several cutters have been forced to cease work for the season. This is having the effect of firming values, and at time of writing (11th June), the market is exceedingly firm, f.a.q. to prime wheaten selling at from £8 to £8 5s. per ton. This very satisfactory price may have the effect of drawing supplies to market, and perhaps cause a slight easing in values, but we think that satisfactory prices will rule for the next two or three months. Nevertheless, farmers with supplies available would be well advised to steadily market.

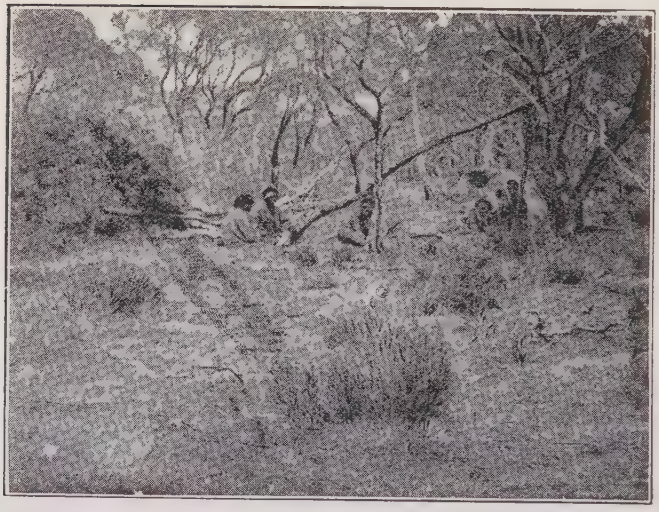
Oaten Chaff.—Supplies during the months enumerated above have been erratic. At times oaten chaff has been hardly procurable, and at others the market almost glutted; but taken throughout the period, satisfactory prices have been ruling. We think that f.a.q. has averaged about £6 per ton. At the time of writing the market is steady, f.a.q. oaten chaff being worth £6 12s. 6d. to £6 15s., good mediums £6 5s. to £6 7s. 6d. per ton.

Oats.—This market has shown very little activity, and prices ruling today are on about a par with prices some three months ago, good heavy feeds selling at from 2s. 6d. to 2s. 8d., mediums 2s. 4d. to 2s. 5d. per bushel. Supplies in the country appear to be more than sufficient for requirements, and if the season progresses satisfactorily, there does not appear any likelihood of better prices ruling; in fact, we are rather of the opinion that values will go lower. Of course, should the Victorian and New South Wales markets improve to any extent, shipment to those States will be possible; but on present prices ruling in the East, profitable business at the moment is impossible. Should inter-State business eventuate at a later date, it must be remembered that nothing but the best quality should be shipped, as oats of

medium and inferior samples are plentiful in Melbourne, and, in fact, at the moment are quite a drug on that market. It must also be borne in mind that oats for shipment must be in good, sound bags, and that Victorian and New South Wales regulations do not permit the use of super bags for oats.

Wheat.—Very satisfactory prices have been ruling for f.a.q., this quality selling at the end of May at around 6s. 8d. per bushel. The market is now a little easier, and 6s. 5d. can be quoted as the present value on the Perth market.

Barley.—Up to a few weeks ago there was an excellent demand for seeding purposes, and up to 4s. 7d. was being secured for good, clean Cape. However, now that seeding demands have been filled, the market is easier, the value of good Cape being from 4s. 2d. to 4s. 3d. per bushel.



METEOROLOGICAL INFORMATION.

1926.

STATIONS.		TEMPERATURE.				RAINFALL.		TEMPERATURE.				RAINFALL.		TEMPERATURE.				RAINFALL.	
		Maximum.		Minimum.		For Month.	Average.	Maximum.		Minimum.		For Month.	Average.	Maximum.		Minimum.		For Month.	Average.
		Mean.	Highest.	Mean.	Lowest.			Mean.	Highest.	Mean.	Lowest.			Mean.	Highest.	Mean.	Lowest.		
		MARCH, 1926.						APRIL, 1926.						MAY, 1926.					
						inches.	inches.					inches.	inches.					inches.	inches.
Chapman Farm	State	87·3	103·0	61·7	54·2	0·25	0·49	77·9	98·1	56·3	44·3	2·07	0·38	71·5	82·5	50·6	44·8	2·21	2·26
Geraldton	...	84·0	101·0	64·3	50·0	0·16	0·40	75·9	86·0	61·0	48·6	2·07	0·89	74·1	83·0	56·2	42·4	1·42	2·80
Walebing	...	83·9	103·0	58·2	49·0	1·06	0·71	72·0	93·8	53·2	39·0	2·21	0·76	67·7	78·3	48·2	38·0	2·41	2·51
Perth	...	79·3	97·7	60·5	53·4	1·91	0·77	72·7	90·3	57·3	42·0	5·85	1·53	68·2	75·0	52·6	43·9	6·37	4·94
Kalamunda	...	79·5	98·0	57·5	44·0	2·29	0·77	70·5	89·0	50·8	43·0	10·17	1·51	66·1	80·0	50·8	41·0	8·43	5·94
Bunbury	...	79·3	87·8	56·8	45·2	0·60	1·01	71·1	89·4	55·7	40·8	6·90	1·66	67·9	75·8	50·1	40·2	6·38	5·30
Bridgetown	...	79·1	94·0	50·7	40·5	1·12	1·01	69·9	91·0	50·5	37·0	4·58	1·58	66·0	75·0	43·8	31·2	4·62	4·57
Albany	...	70·2	79·0	58·3	51·4	2·36	1·51	67·4	78·0	55·4	42·4	5·71	2·66	65·3	73·0	51·0	43·0	2·28	5·10
Merredin Farm	State	79·8	97·9	58·5	52·1	1·99	0·83	72·6	91·6	52·9	35·1	0·60	0·80	65·1	77·2	45·9	36·4	0·91	1·33
Northam	...	82·7	102·0	59·7	52·2	1·75	0·67	74·0	95·3	54·1	39·8	2·12	0·80	66·9	78·1	46·6	37·8	2·14	2·22
York	...	82·7	100 4	57·9	44·0	1·52	0·58	74·4	94·0	53·8	38·0	1·92	0·82	67·7	78·8	46·1	36·0	2·64	2·34
Narrogin Farm	State	77·4	95·5	53·1	45·8	3·09	0·64	69·9	85·8	51·0	38·0	2·47	1·12	63·6	72·0	45·3	35·7	2·71	2·84
Katanning	...	75·8	95·0	53·7	44·4	2·10	0·94	68·5	85·0	51·6	40·1	2·57	1·14	63·0	72·9	46·4	36·4	2·24	2·34
Cape Leeuwin	...	72·9	81·0	60·8	56·0	1·59	1·22	71·8	82·5	59·4	45·0	4·07	2·03	65·6	74·0	55·3	49·0	7·37	5·66

WESTERN AUSTRALIA—DEPARTMENT OF AGRICULTURE.

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The following publications may be obtained from the Department of Agriculture, Perth, on application, or will be sent post free to any address in this State on receipt of a remittance for the amount stated:—

The Handbook of Horticulture and Viticulture of Western Australia, by A. Despessis, M.R.A.C.:
This publication contains valuable information dealing with all commercial fruits grown in Western Australia, including advice on planting, pruning, packing, manuring, fruit-drying, wine-making, insect and fungoid pests and their treatment, etc., and the whole forms a text book which every fruitgrower, whether large or small, should have in his possession. The price originally was 8s. 6d., but to allow of distribution being as wide as possible it has been reduced to 2s.

The Pruning of Fruit Trees, by J. F. Moody, Fruit Industries Commissioner:
This publication contains numerous illustrations, being reproduction of photographs taken in this State, of pruned and unpruned trees, which make the details set out in the letterpress particularly easy to understand. Price 2s. 6d.

Fruit Packing and the Marketing and Exporting of Fruit, by J. F. Moody, Fruit Industries Commissioner, and J. Ramage, Packing Instructor:
This publication contains invaluable information on packing and grading fruit for local and export markets. It is freely illustrated, and no fruit-packing shed should be without a copy. Price 1s. 6d.

The Poultry Keepers' Manual, by George Allman, Government Poultry Expert:
This is a most useful and valuable book, not only for beginners, but to all those who keep fowls for pleasure and profit. It deals fully with all matters connected with the industry, including Breeding, Feeding (for stock birds or egg production), Incubating, Brooding and care of chicks, Marketing (eggs and poultry), and all matters of use to the poultry-keeper. It also fully describes symptons of various ailments and diseases and simple treatment for same, and, as the book was written to suit *local conditions,* every poultry-keeper should have a copy by him Price, 1s.

Agricultural Bank.

ADVANCES TO FARMERS:

The Agricultural Bank, which is a State institution and is worked under a Special Act, was founded with the object of making advances to settlers for the purpose of assisting and encouraging them during the early years of the development of their farm.

The Agricultural Bank makes advances on approved securities to approved persons engaged in the business of farming or grazing, or in horticultural pursuits, to an amount not exceeding £2,000.

Every application must be made on the prescribed form, and must contain full particulars of the purposes for which the advance is required.

Where an advance is approved for effecting improvements on the borrower's land, such advance is made by progress payments as the work progresses.

Developmental advances are usually made for clearing, fencing, ringbarking, and water supply, and are made to the full value of the work done after it has been inspected and certified to by a responsible officer. After a reasonable stage of development has been reached, and providing the general progress of the settler is considered satisfactory, limited assistance is granted towards building (maximum £250), and money is provided to assist in the purchase of stock and machinery, the maximum amount for this purpose, except in special cases, being £150.

Interest is charged at the rate of seven per cent. per annum, and repayment of principal extends over a period of 30 years, except in the case of stock or machinery advances which have a currency of eight years only.

The security required by the Bank is a first mortgage over the lands on which the advance is to be expended, and such lands may consist of:—

(a) Holdings in fee simple; or
(b) Holdings under Special Occupation Lease or Conditional Purchase from the Crown; or
(c) Homestead Farms; or
(d) Such other real or leasehold property as the Trustees may think fit.

Mortgages are prepared free of charge; but borrowers are required to pay the statutory costs of registration

Interest only on the advances made is charged during the first 10 years, and repayment of the capital does not commence until the eleventh year.

Application may be for sums of £25, or any multiple thereof, not exceeding £2,000. Each application must be accompanied by a valuation fee of one per cent. of the amount applied for. No refund of fee is allowed after an inspection of the security has been made.

The leases, or Occupation Certificate, as the case may be, together with the fees, must be in the possession of the Bank before a mortgage can be prepared.

REGISTRATION FEES.

	s.	d.
For each Conditional Purchase, Homestead Farm, or Grazing Lease under the Land Act	5	0
For each Freehold Lot or Crown Lease	10	0
For every additional Freehold Lot or Crown Lease	2	0

STAMP DUTY

	s.	d.		s.	d.
Up to £50	1	3	From £301 to £400	10	0
From £51 to £100	2	6	„ £400 „ £500	12	6
„ £101 „ £150	3	9	Stock Bill of Sale, up to £50	5	0
„ £151 „ £200	5	0	„ „ over £50	10	0
„ £201 „ £250	6	3	Machinery Bill of Sale, up to £50	5	0
„ £251 „ £300	7	6	„ „ „ over £50	10	0

Intending borrowers are requested to note that no advances are made against improvements effected prior to date of application. Applications should, in every instance, be lodged prior to commencement of work, and moneys are then paid over in progress payments as the work proceeds.

IMPROVED FARMS.

The Trustees of the Agricultural Bank have, from time to time, improved farms on their hands which have been abandoned for various causes, or have been taken over as security for loans. These farms are available for purchase, and extended terms are given for payment of the amount. They often offer to intending settlers an opportunity of obtaining an improved holding, ready for occupation, at a cheap rate, without having to undertake the preliminary work of clearing and fencing. The properties, when obtainable, are advertised in the "Government Gazette"; but anyone wishing for particulars of such farms as may be available should make application to the Managing Trustee of the Agricultural Bank. Particulars will then be sent, and an inspection can be made by the intending settler to ascertain whether the same is suitable for his requirements.

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2—4

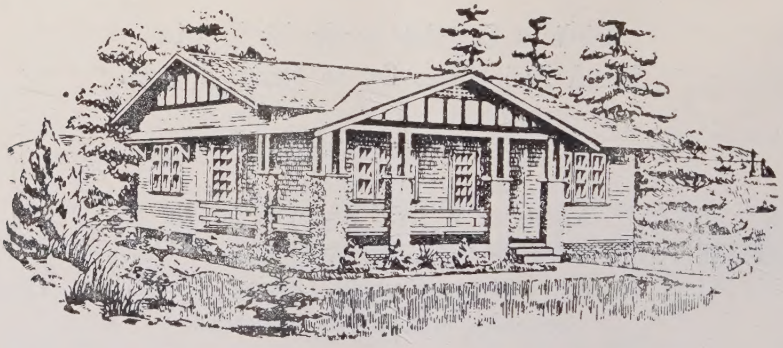
Every man has his ideals

—And naturally it is to be expected that SOME REFLECTION of these ideals would be found in his HOME LIFE of which the HOME ITSELF forms an integral part.

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2—4